"MOVE OVER!"

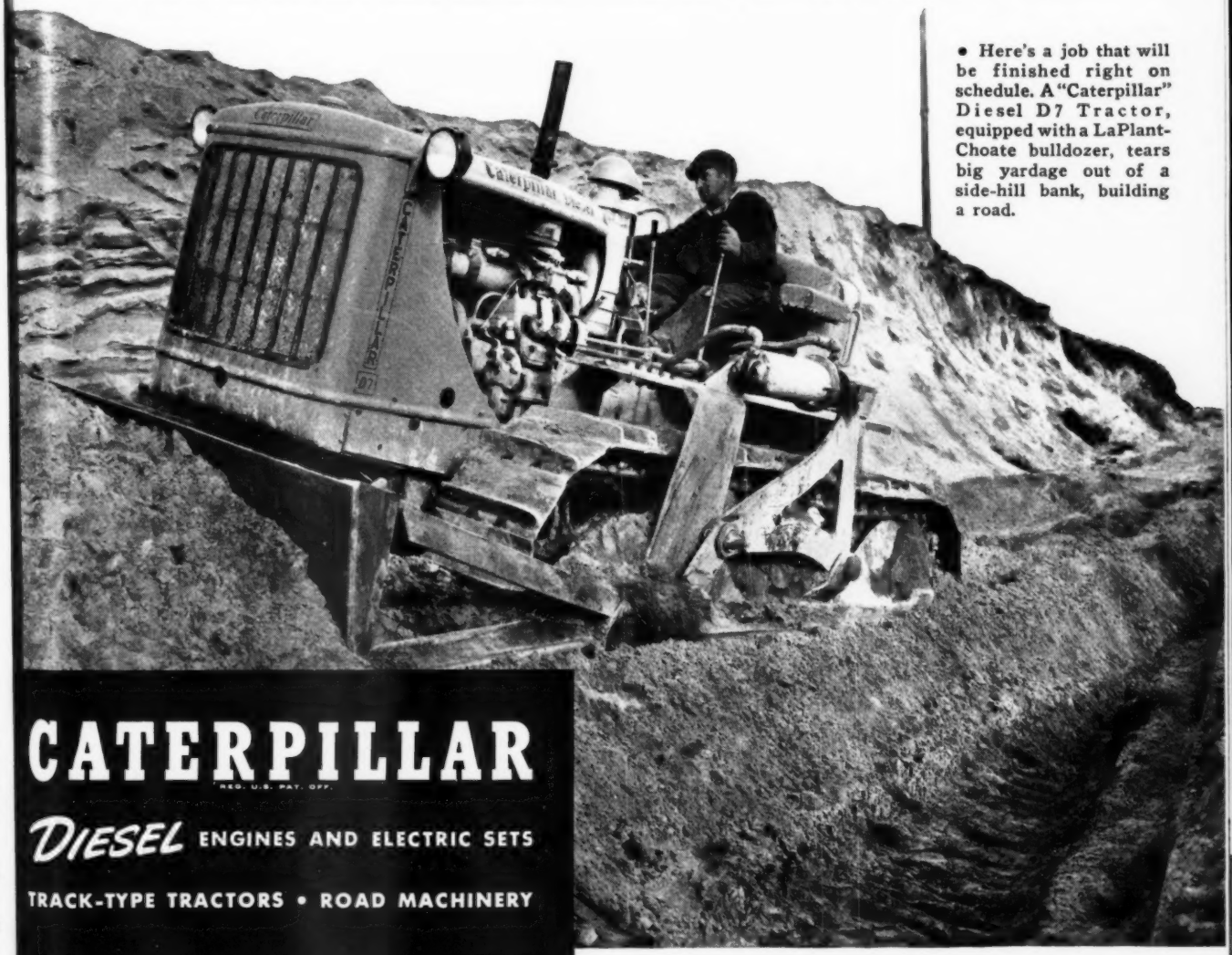
WHEN a 12-ton husky says "Move over!"—dirt gets out of the way. And it moves double-quick when the power back of the bulldozer is "Caterpillar" power!

Right across America, "Caterpillar" Diesel Tractors, Engines and Road Machines are licking the tough jobs—saving precious days and weeks in the all-out effort of defense.

Never before in the nation's history has *time* been of such vital importance as today. Roads must be built, airports cleared and graded, naval bases prepared, manufacturing plants expanded—all at a speed undreamed of even a year ago.

Wherever time is the essential factor, "Caterpillar" equipment comes to the front. The great dirt-moving and road-shaping capacity of these machines makes them indispensable to fast operation. And they're built through and through with the rugged quality and stamina to stay on the job—night and day if necessary—till the work is done.

CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS



• Here's a job that will be finished right on schedule. A "Caterpillar" Diesel D7 Tractor, equipped with a LaPlant-Choate bulldozer, tears big yardage out of a side-hill bank, building a road.

CATERPILLAR

REG. U.S. PAT. OFF.

DIESEL ENGINES AND ELECTRIC SETS

TRACK-TYPE TRACTORS • ROAD MACHINERY

● **A diesel-powered International truck receives a dipperful of iron ore. Owned by Butler Brothers, of Cooley, Minnesota, this six-wheel truck transports iron ore from the Kiven and Patrick-Ann mines.**

Philadelphia extension found that it would net $2,653,000 annually for the first 10 years at a 60-cent toll for passenger cars and truck rates from $1.50 to $3 for the Philadelphia-Harrisburg trip. A Philadelphia-Pittsburgh all-turnpike rate of $2 was recommended for passenger cars. The route from Harrisburg to Pittsburgh now costs $1.50 for passenger cars, but it was pointed out that this tunnels a number of mountains, while the extension to Philadelphia would encounter comparatively few hills.

Traffic on the proposed extension during the first year was estimated at 2,202,000 vehicles, including 1,008,000 passenger cars from Pennsylvania. There would be an estimated 770,000 passenger cars from other states; 320,000 heavy trucks; 72,000 medium trucks; 20,000 light trucks and 12,000 buses. This would bring the estimated first-year receipts to $1,720,000.

Average estimated annual receipts for the first five years would be $2,302,000, considerably more than the estimate for the first year, but $350,000 less than the estimated average for the first 10 years.

Although the traffic survey indicated the cost of construction of the proposed extension would approximate $50,000,000, there have been other announced estimates placing the cost at between $60,000,000 and $70,000,000.

Gold a By-Product of Central Valley Project

Add gold to the long list of by-product benefits of the Central Valley Reclamation project in California.

Government news reports state that a check for $37,993 has been tendered to the government as its share of the gold recovered from sand and gravel processed on the irrigation project.

The gold was extracted from the sand, gravel and rock aggregate being excavated for mixture with cement to produce concrete for Friant Dam, one of the two great water storage structures under construction on the project.

Gold separation operations which began in August last year have resulted in a recovery of $94,520 worth of the precious metal to June 30 this year — nearly $10,000 a month.

Expenses of recovering the gold were $18,534, including the cost of constructing the plant.

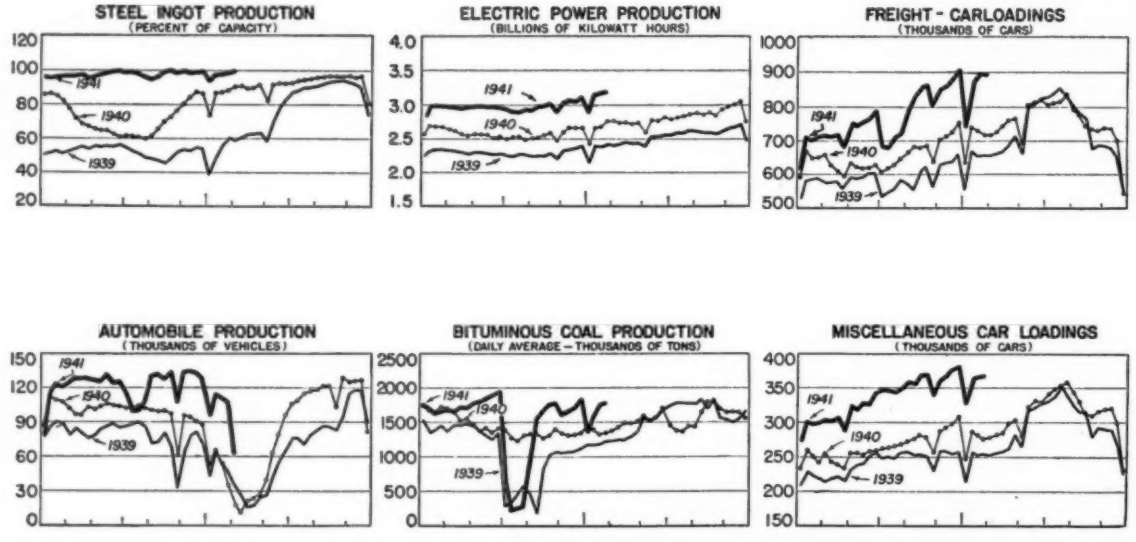
Under his agreement with the Bureau of Reclamation, the contractor who was awarded the job of constructing the large concrete dam, fourth in size in the world, has turned over half the net proceeds to the Bureau.

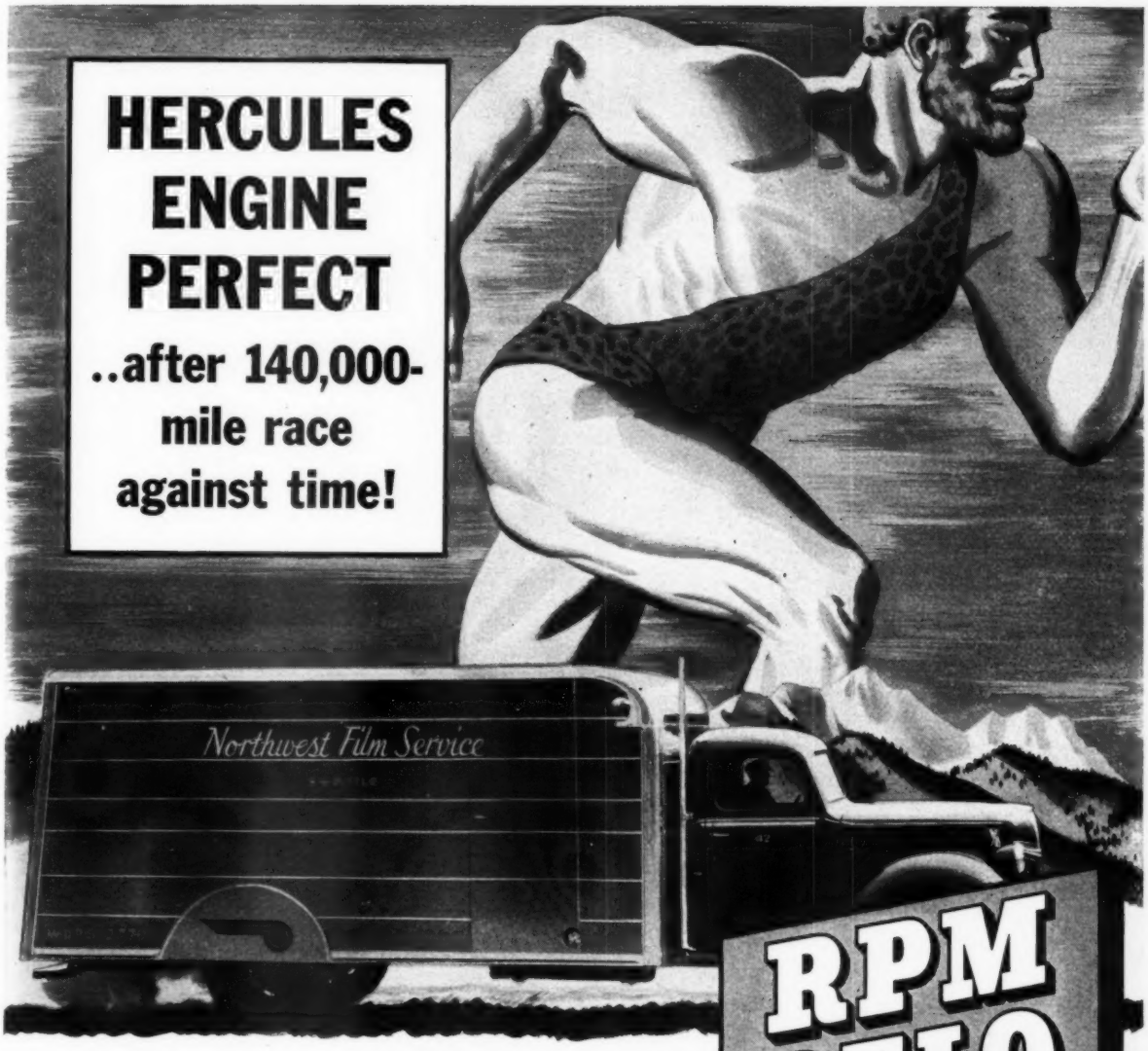
Government Appoints Construction Chief

The appointment of S. Morris Livingston, previously economist for the investment counsel firm of Scudder, Stevens and Clark, as chief of the new construction unit in the Bureau of Foreign and Domestic Commerce, has been announced by Carroll L. Wilson, director of the bureau.

Mr. Livingston has had many years

MONTHLY BUSINESS INDICATORS





HAVE YOU a herculean Diesel job? One where you MUST hit the ball day after day—one where costs must be kept 'way down . . . then see how RPM DELO helped the Northwest Film Service of Seattle:

Their job is to distribute films on a lightning-fast schedule—mile after mile—week after week—across rugged mountain ranges—all over the State of Washington. And *do* it at the gruelling rate of 10,000 miles a month—using one lone truck powered with a Hercules motor. Difficulties, now and then? Costly trouble? Not in 14 months! *Not in 140,000 miles!*

No wonder Fred J. Londry, executive of the film company, writes in! Yes, and he gives enthusiastic credit to his Hercules Diesel—and to RPM DELO that made this record performance possible!

So here's a tip—next time call for RPM DELO—the oil that ends ring, bearing and sludge trouble. Watch it cut costs.

ORDER RPM DELO *Unequaled* FOR YOUR DIESELS

Approved by the makers of over 95% of the installed Diesel horsepower in America, RPM DELO is marketed under the following names:

RPM DELO
Kyso RPM DELO · Sohio RPM DELO
Signal RPM DELO · Caltex RPM DELO
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Ask your Diesel engine manufacturer or distributor for the RPM DELO supplier in your locality.

STANDARD OIL COMPANY OF CALIFORNIA

For your convenience in writing to Standard Oil Company of California, you will find a card bound in this issue.

of practical experience in analyzing special construction problems and interpreting general business conditions as they affect the current operations and future outlook of the construction industry.

Joseph H. Ehlers, a construction engineer of wide experience, recently associated with Modjeski & Masters, consulting engineers, has been retained as technical specialist. Mr. Ehlers served for several years as liaison officer of the Public Works Administration.

While the organization of the unit has been contemplated for several months, its establishment at this time was prompted by a very evident need for a more complete and detailed analysis of current conditions in the construction industry, according to Director Wilson.

The new unit will develop, cooperatively with other government agencies and with industry, a broad picture of all construction activities particularly as needed by the National Income and Commodity sections of the bureau. It will also offer assistance to trade associations and others in the construction field in their current operating problems.

Woods Bros. Const. Co. Elect New President

Robert V. Hoopes has been elected president and a director of the Woods Bros. Construction Company, Omaha, Nebraska, effective August 15, succeeding Franklin G. Floete who resigned to accept the presidency of the Iowa Tractor & Implement Company, according to an announcement made by Edwin M. Stark, Chairman of the Board.

For the past 26 years Mr. Hoopes has been with the Great Lakes Dredge & Dock Company of Chicago, for many years he has been a director of the Company and the past eight years executive vice president. Mr. Hoopes brings a broad experience to his new connection as an engineer and executive both in the field of general and marine construction and it is expected that greater activity in construction for national defense will result.

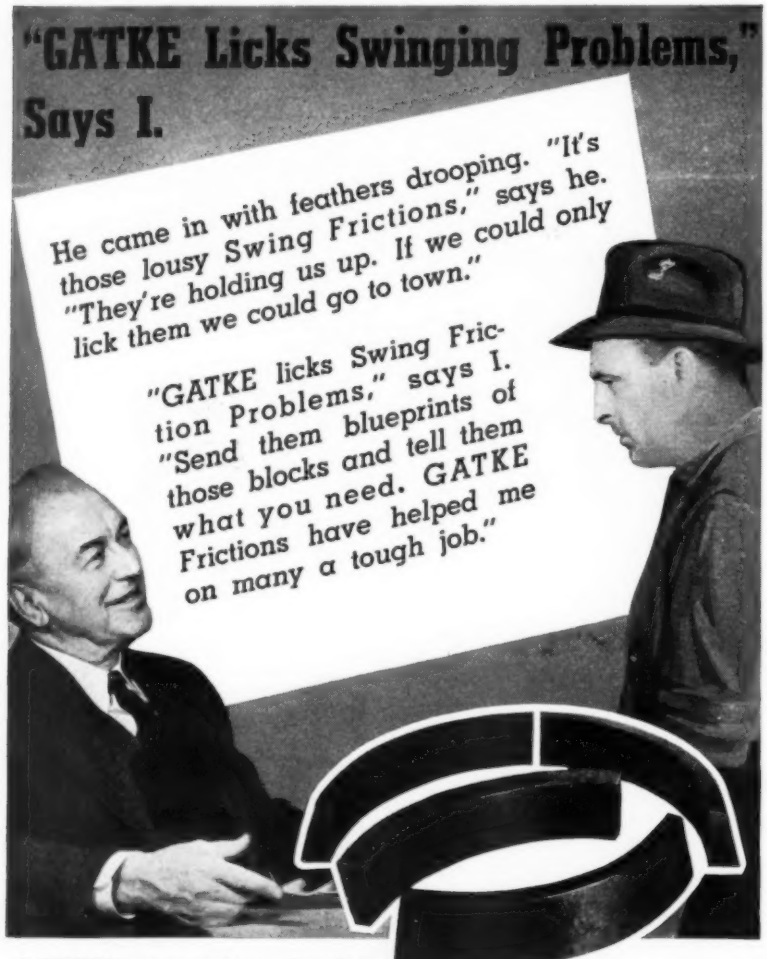
The Woods Bros. Construction Company has an interest in the construction of the bomber plant being built near Omaha, Nebraska, which is to be operated by the Glenn L. Martin Company. It is also completing the construction of the substructure for the hydro-electric power plant at Fork Peck Dam in Montana, upon which will be placed two large turbines, one of 50,000 horse power, which is said to be the largest in the world. Other construction activities have been the Starved Rock Dam at Ottawa, Illinois, 14 miles of sea wall on the Gulf Coast, a number of steel and concrete bridges, an airport, the Edgewood cut-off for the Illinois Central Railroad in Southern Illinois, the Styvesant Docks in New Orleans, and more than $30,000,000 of pile dike, revetment, and dredging on the Missouri River for the United States Corps of Engineers.

Prospecting With a Water Well Drill

By J. C. Coyle

While a "rolling stone" may gather no moss, it is equally true that only moving equipment gathers profits for contractors. Thus it was that May, 1940, found the W. E. Callahan Construction Company's 33-W Bucyrus-Erie well drill at Colorado Siding, on the All-American Canal, all dressed up and ready to go again. There was a place to go, too. Up in the mountains of the Placerville district, 60 miles from Boise, Idaho, W. E. Callahan and Major L. D. Crawford, vice president of the firm, were investigating some 6,000,000 cubic yards of gravel for gold values. Finis had been written to six years of contracts on the All-American Canal and its Coachella Branch, and drill and crew were ready to hop.

Most of the excavation on thirty miles of the main canal, and 43 miles of the branch, had been common, so that the drill had only been needed in sinking some 6-inch blast holes in a small rock section of the contract near Laguna Dam. These holes were drilled five feet below bottom, or an average of 60 feet deep. Spaced 10 to 30 feet apart, according to hardness of the conglomerate; when blasted, they enabled one of the four walking type Bucyrus-Monighan draglines on the canal job to excavate


"GATKE Licks Swinging Problems," Says I.
He came in with feathers drooping. "It's those lousy Swing Frictions," says he. "They're holding us up. If we could only lick them we could go to town."
"GATKE licks Swing Friction Problems," says I. "Send them blueprints of those blocks and tell them what you need. GATKE Frictions have helped me on many a tough job."

GATKE'S tremendous development resources work the year around perfecting better friction materials to meet increasingly severe service requirements.

Experience acquired in 27 years of licking tough jobs is available in their application.

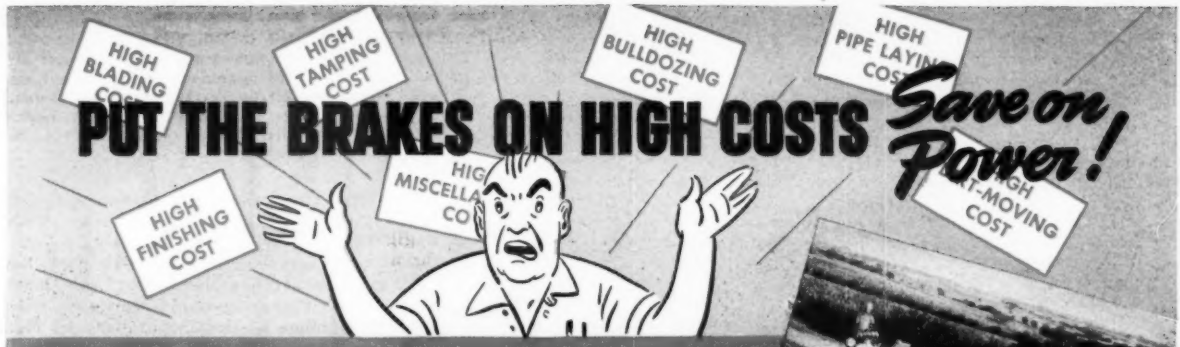
Whatever your service—whether it's Frictions, Brake Lining or Clutch Facings—GATKE has what it takes to do the job.

For recommendations just tell us what you need.

GATKE CORPORATION

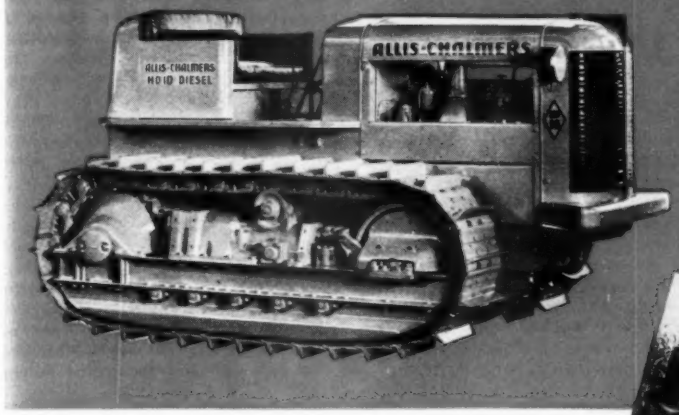
230 N. La Salle St. Chicago, Ill.

For your convenience in writing to Gatke Corporation, Inc., you will find a card bound in this issue.



PUT THE BRAKES ON HIGH COSTS *Save on Power!*

HD-10 HANDLES ALL THESE JOBS..



∧ HD-10 easily handles 10 or 12-foot Leaning Frame blade graders.

∧ Power to spare ... more than enough to work both ends at the same time.

∧ Ideal with Gar Wood 2-wheel scrapers—fastest digging and dumping outfits available!

2-cycle engine purrs quietly through tough pusher work. >

< Puts capacity loads in Gar Wood 8 or 10-yard scrapers.

No need to use bigger, higher-powered tractors on blade-grading, bulldozing, finishing, tamping and miscellaneous work. You can easily do these jobs with the HD-10 (87 drawbar h.p.)... and at considerable savings—there's less investment, less depreciation, smaller operating cost ...ADDITIONAL PROFITS FOR YOU. There's power to spare with the heavy-duty 2-cycle Diesel engine—hangs on to overloads with tenacity of steam power. In addition, throttle control reduces gear shifting ... speeds up the work. Operates on regular Diesel fuel. Investigate this power and money-saving HD-10 ... NOW. See your Allis-Chalmers dealer.

ALLIS-CHALMERS
TRACTOR DIVISION · MILWAUKEE · U. S. A.

2-CYCLE DIESEL POWER
3 SIZES: HD-7, HD-10, HD-14
60 TO 132 DRAWBAR HORSEPOWER

For your convenience in writing to Allis-Chalmers, you will find a card bound in this issue.

• A lull in the operations affords time for oiling the point sheave on the Bucyrus-Erie 33-W water well drill employed as a prospecting unit by W. E. Callahan Construction Company in Idaho's Placerville district. Note canvas sun shelter.

the channel to grade with comparatively little secondary blasting. A wagon drill was also used in the channel, and some jackhammers on the slopes.

The rig had come to the All-American job from up in Colorado, so another jump of 1,200 miles or more to Placerville was just part of the routine. Dusty from recent disuse, the rig was rolled out and given a nice hot shower with a Kerrick Kleaner before being groomed for the road. Freed from accumulated grease and dirt by the spray of live steam and chemicals, the tools, along with the metal front wheels of the machine, were loaded on a 1½-ton Ford truck which was to tow the rig. A gooseneck Y, made by cutting and welding section of 6-inch channel steel, was welded to the corners of the drill chassis, converting the machine into a trailer unit. It was hooked beneath the rear end of the truck by a swivel hitch and a safety chain. Dual wheels, with 34x7 Goodyear balloon tires, were permanently installed at the rear of the machine.

"Frosty," a gigantic coal black Belgian sheep dog, and "Doby" his Doberman Pinscher, pal (assistant night watchmen at the shops) were on hand to bid goodbye to W. H. Ross, who drove the truck, and C. R. Keener, the driller who followed with a car and house trailer. The four-day trip to Boise was without incident, but the final 60 miles was largely narrow mountain road with sharp curves and long steep grades. A helper truck had to be used in negotiating it. V. H. Gray, superintendent, and L. R. Sloan, engineer for the firm were already at the job.

Once on location, the front wheels were replaced on the rig, but were removed when moving any distance when the trailer hitch to the truck was used. Twenty-seven 6-inch prospecting holes were drilled in spots over an area of about 400 acres, one reaching a depth of 65 feet and the others ranging from 10 to 40 feet. A medium weight string of tools was used, and wire rope was changed once on the job. Steel casing, driven with the regular head, was used and 790 feet of hole was drilled during

IT'S GOT 'EM ALL LICKED FOR DIGGING POWER

A BIG CONTRACTOR REPORTS: "When it comes to excavating work, our Williams Bucket surely digs. We don't believe better buckets are built."
You'll say so too, once you use a Williams Bucket.

Williams Buckets and Parts are carried by distributors in all parts of the country. Bulletins covering Williams Power Arm, Multiple Rope, and Dragline Buckets sent on request.

THE WELLMAN ENGINEERING CO.
7002 Central Avenue Cleveland, Ohio

WILLIAMS *Buckets*
built by WELLMAN

For your convenience in writing to The Wellman Engineering Co., you will find a card bound in this issue.

KOEHRING POWER — built into the shovel from engine to clutches, gears, and crowd—power that flows without loss or interruption to the digging dipper — is the "stuff" that counts to maintain high speed maximum production on day and night working schedules.

KOEHRING STRENGTH — built into the shovel to "take" the power — strength without a weak link — Heavy-Duty construction—from crawlers to dipper—is the quality required for high speed digging in all types of material. Dirt or rock, Koehring strength is digging strength.

Koehring equipment is noted for its quality and honest workmanship. Profits are made from working, not buying a shovel. Buy Koehring for working qualities and profit.

KOEHRING COMPANY MILWAUKEE, WISCONSIN

KOEHRING HEAVY DUTY

HEAVY-DUTY CONSTRUCTION EQUIPMENT

For your convenience in writing to Koehring Co., you will find a card bound in this issue.

the four months on the job. The crew consisted of the driller, helper, and a panner.

Every foot of hole was tested and a record made of gold values. For this purpose a 12-inch by 12-inch metal box, eight feet long, was used in which to dump the bailer. The box, placed at an angle on the frame, had an outlet at the lower end through which gravel was washed by pouring water from barrels into the box which in turn emptied into a gold pan at the bottom of a tub placed under the end of the box. The gold was then separated from the gravel by panning. Drill bits were heated in a forge and dressed by hand when necessary. Although most of the drilling was loose gravel, there was no trouble from caving, as the casing was kept near the bottom of the hole.

Keswick Dam Contract Awarded

The construction of Keswick Dam on the Sacramento River in California, second large dam of the Central Valley project to supply power for national defense, will soon begin, according to Bureau of Reclamation reports.

Guy F. Atkinson Company of San Francisco and W. E. Kier Construction Company of San Diego submitted jointly the successful bid of $2,736,628.50, which was the lowest of three bids received and opened by the Bureau of Reclamation at its Sacramento office on August 1.

Planned as a concrete structure 125 feet high, Keswick Dam will create an afterbay reservoir on the Sacramento River nine miles downstream from Shasta Dam. It will be operated to re-regulate the variable releases from the Shasta power plant, to generate additional electric power, and to serve as a barrier and trap in the Sacramento salmon salvage program. Migratory fish which cannot pass the 560-foot high Shasta Dam will be trapped and transplanted to other streams below Keswick Dam or stripped of their eggs for artificial hatching in a Government hatcher.

The contract, covering the first stage of construction, includes the construction of the foundations and base of the abutments, spillway, and powerhouse, the completion of the fish trap in the center of the dam, and in addition, the construction of an operating road between Quartz Hill road and the left abutment of the dam and the excavation required for the relocation of the railroad at the right end of the dam to permit construction of the right abutment and powerhouse structure.

The work involves the excavation of 396,000 cu. yds. of materials for the dam, the excavation of 459,000 cu. yds. for the 1,500-foot railroad relocation, the excavation of 42,050 cu. yds. for the one and one-third-mile road, the placing of 94,000 cu. yds. of concrete in the dam, the installing of 1,800 tons of reinforcement bars, and 244,000 lbs. of gates, hoists, cranes, and fish tanks.

The contractor is required to complete all work within 500 days after receiving notice to begin work.

Virginia Appoints New Highway Commissioner

Virginia's new state highway commissioner is Brigadier General James A. Anderson, who was appointed by Governor Price to succeed the late Henry G. Shirley, who died July 16.

A 48-year-old Virginian, whose career as a civil engineer and soldier has included high responsibilities as a planner of Virginia public works and coordinator of its defense efforts, General Anderson took over direction of the state's 45,000-mile road system on August 1 for Shirley's unexpired term which extends through June 30 of next year. His appointment to the $12,500-a-year position will be subject to confirmation by the state senate next winter.

General Anderson has been serving as head of the department of civil engineering and academic executive, or dean, at Virginia Military Institute with which he has been connected since 1919, except for the three years 1933-36 in which he directed the Federal Public Works Administration in Virginia. In the latter capacity he supervised a $30,000,000 construction program.

Last December he was loaned to the state by V.M.I. to serve as coordinator for the State Defense Council.

SAUERMAN LONG RANGE MACHINES

Sauerman Slackline Cableway dumping spoil onto high pile.

Sauerman Drag Scraper hauling blasted rock to crusher.

Dig and Haul . . . Store and Reclaim . . . Any Capacity up to 1000 t.p.h.

Long reach, simplicity of installation, low cost operation and adaptability to unusual ground conditions are features of SAUERMAN Power Drag Scrapers and Cableway Excavators that recommend these machines for a variety of digging jobs and the handling of all kinds of bulk materials.

Because of their unique design these machines require a minimum of elaborate machinery, making it extremely practical to set them up at inaccessible places. With few moving parts to get out of kilter, a small replacement inventory insures steady operation.

Write for our catalog and see for yourself how others have cut costs on hundreds of tough jobs with Sauerman Machines.

SAUERMAN BROS., INC.
474 S. CLINTON STREET
CHICAGO

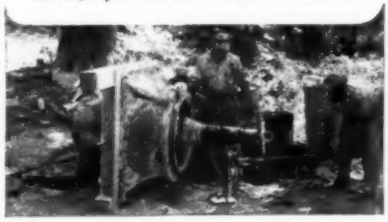
What's It Costing You To Be Without Simplex Jacks?

Let Simplex Jacks do the tugging, shoving, lifting and lowering jobs and save your men for other work. A man and one jack does work of a gang. Kentucky contractor says: "Our Simplex No. 22 (lifts 10-tons on cap or toe lift) does the work of a couple of extra men — wouldn't trade it for any other tool. Great for shovel, tractor and crusher repairs in our pit." There's a Simplex Jack for every construction job — every one a time saver and cost cutter — see them all in Catalog 41.

Sold by leading supply houses

Templeton, Kenly & Co.
Chicago, Ill.

Better, Safer Construction Jacks Since 1899



Simplex Jacks
dependable and efficient
Lever Type for toe and cap lifting.
Hydraulic for easier cap lifting.
Screw Jacks for economy.

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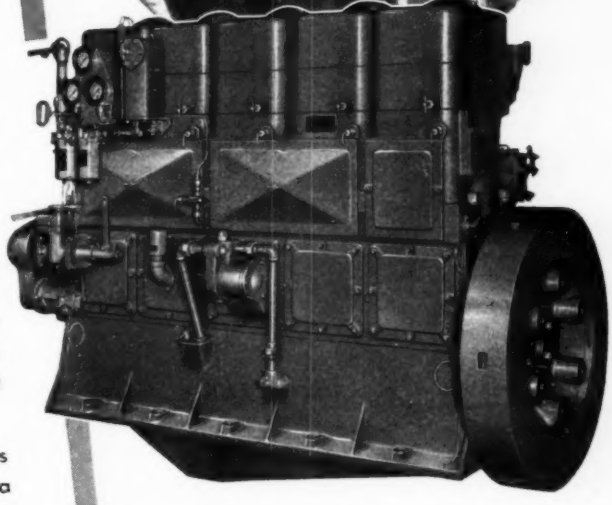
3 times the Service

Before an OVERHAUL!

"I HAVE OPERATED and maintained all kinds of power shovels and draglines, machines powered with high speed Diesels and slow speed Diesels, with gasoline engines and with steam", says Robert Talbert of R. W. Briggs & Company, San Antonio contractors working on Caddoa Dam in Southeastern Colorado, "and it has been my experience that an excavator powered with a heavy duty, slow speed Atlas Diesel will keep swinging at least three times as long as a machine powered by a high speed Diesel, before it becomes necessary to overhaul. The harder the going, the more they get down and 'lug'. They will walk right through a bank that will stall a high speed engine that does not have the Atlas torque."

Those are the opinions of a man who speaks from experience. Today he is operating a P. & H. Model 955, handling 350-400 yards an hour on 5 gallons of fuel.



Atlas Imperial Diesel Engine

ATLAS IMPERIAL DIESEL ENGINE CO.

EASTERN DIVISION . . . . 115 BROAD STREET, NEW YORK, N.Y.
CENTRAL DIVISION . . . . 228 NO. LA SALLE ST., CHICAGO, ILL.
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INDUSTRIAL • MARINE • STATIONARY

For your convenience in writing to Atlas Imperial Diesel Engine Co., you will find a card bound in this issue.

NOT in the *Contract*

A colored preacher at the close of his sermon, discovered one of his deacons asleep. He said: "We will now have a few minutes of prayer. Deacon Brown will lead."

"Lead!", said Deacon Brown, suddenly awakening, "I just dealt."

"Melvin. Melvin!!"

"What, Ma?"

"Are you spitting in the fish bowl?"

"No, Ma, but I'm comin' pretty close."

Johnson, a bachelor, had been to call on his sister, and was shown the new baby. The next day some friends asked him to describe it. The bachelor replied: "Um—very small features, clean shaven, red faced and a very hard drinker."

Little Mary: "Mother, they are going to teach us domestic 'silence' at school, now."

Mother: "Don't you mean domestic science?"

Father: "There is a bare hope that our little girl means what she is saying."

If all the men who sleep in church were laid end to end they would be more comfortable.

Shovelrunner Ike applied at a Canadian recruiting office to enlist.

"I suppose you want a commission?" said the officer in charge.

"Gosh, no," was the reply. "I'm such a poor shot, I'd rather work on a straight salary."

Hotel Page: "Telegram for Mr. Niedspondiavanci, telegram for Mr. Niedspondiavanci!"

Mr. Niedspondiavanci: "What initial, please?"

Drunk (bumping into lamp post): "Excuse me, sir." (Bumping into fire hydrant): "Excuse me, boy." (Bumping into second lamp post): "Well, I'll just sit here until the crowd passes."

Pastor—Good morning, May. I hear God has seen fit to send you two little twin brothers.

Little May—Yes, sir, and He knows where the money's coming from, too. Daddy said so.

"Would you please step aside, this is for a construction publication!"

John: "Teacher, can someone be punished for something he didn't do?"

Teacher: "Why, no, of course not."

John: "Well, I haven't done my arithmetic."

A recession is a period in which you tighten up your belt.

A depression is a time in which you have no belt to tighten.

When you have no pants to hold up it's a panic.

"Mr. Swiggs—Er—ah, that is, can—er I—will you—?"

"Why, yes, my boy; you may have her."

"How's that? Have whom?"

"My daughter, of course. You want to marry her, don't you?"

"No, sir; I just wanted to find out if you would endorse my note for $100."

"Certainly not. Why, I hardly know you."

The Scandinavian had just arrived in California, delighted with the way his new car withstood the trials and tribulations of the trip.

"How are the roads, Hans?"

"Vell, dis guy Lincoln vas uh great engineer, but dat Frenchman De Tour he vas no roadbuilder at all."

"They say Mrs. James plays golf just like a man."

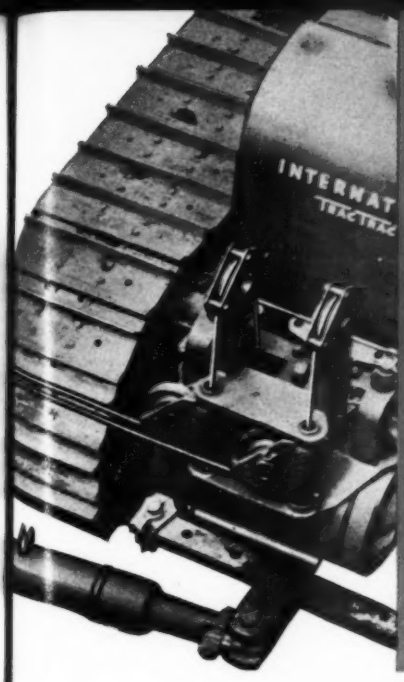
"She should be ashamed to use such language."

"It's so good of you, doctor, to have come so far to see my husband."

"Not at all madam, not at all. I have a patient next door, and I thought I'd kill two birds with one stone."

A maiden lady lived in a small house in the country with one maid. One morning the bell rang. The maid admitted the visitor, an evacuee officer, arranging for homes for children evacuated from London, then rushed upstairs.

"Please mum," she blurted out breathlessly, "you've got to have two babies, and the man's downstairs!"



Long ROPE LIFE

Bucyrus-Erie 4-wheel scrapers give you every feature you need for cheap dirt-moving. From control unit to rear wheels these scrapers are engineered to keep your costs down. There is rope cost for instance:

All cable is reeved so that there are no side bends, no damaging twists, and only a minimum number of reverse bends.

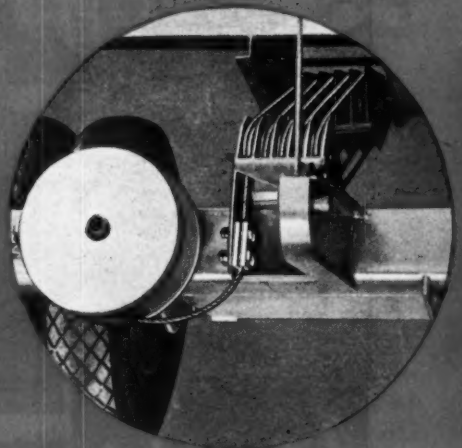
The sheaves are big; they're all vertical with horizontal axes; they're mounted on easy-rolling anti-friction bearings; on each model they're all the same size and interchangeable.

Self-aligning fairleads on scraper and control unit prevent fouling between the unit and scraper and eliminate lateral or vertical cable distortion.

Wear occurs within a few feet of the control unit, where the cable is easy to watch, and where worn cable can be easily and economically removed.

Bucyrus-Erie 4-Wheel scrapers are easy on cable and keep rope costs low. This is one of many ways in which they will increase your dirt-moving profits. Bucyrus-Erie Company, South Milwaukee, Wisconsin.

All cable reeved in a straight line.



Front and rear spindles carry reserve reels of cable easily fed in through non-pinching anchors. Cable is fed from anchors onto welded-in-place snubber spools. P85

FOR BUCYRUS ERIE TRACTOR EQUIPMENT

See your INTERNATIONAL TRACTRACTOR DISTRIBUTOR

"Doodlebugging Deluxe"

(Continued from page 511)

speed of the hoist is 270 fpm. and that of the drag is 165 fpm.

Surprising feature of the project is the immense amount of material handled with practically no other equipment than the 14-yard dragline and washing plant conveyor. There is no drilling or blasting and no overhaul. No small draglines or shovels, no dirt trucks and no scrapers are to be used in moving the estimated 12,000,000 cubic yards. In fact, practically the only equipment on the job besides the dragline and dredge are one Dodge service truck and one RD8 Caterpillar tractor, a Lincoln welding outfit for the boat and a General Electric welder for the 15-W.

Machinery for the washing plant was installed by the Bodinson Manufacturing Company of San Francisco, builders of the majority of the West's largest washing plants.

• A Gar Wood scraper pulled by an Allis-Chalmers tractor picks up a load of fill material.

P. S. Crocker is in charge of operations for the Dayton Dredging Company, of which G. M. Standifer of San Francisco is president. Dan Avery is job superintendent and Bill Waters, chief engineer.

Six Month City

(Continued from page 515)

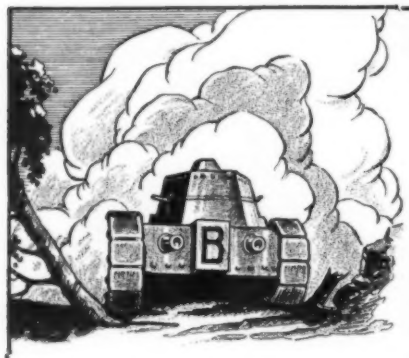
had been devoted to the project by more than 8,000 employees.

The net result was that when the first group of 600 officers and 3,700 enlisted men arrived from Fort Knox, Kentucky, the camp was ready for them on scheduled time. Transfer of personnel and equipment from the First Armored Division at Fort Knox to the Fourth Armored Division at Pine Camp was effected by rail and overland motor convoy. From then on more and more soldiers poured in, but the contractors were finished and out of the way of each new batch of men.

General George C. Marshall, U. S. Army Chief of Staff, speaking before the house appropriations committee, is quoted as stating that Pine Camp is one of the few cantonments now under construction which carried out "an especially fine example of good planning and execution." He was particularly pleased with the efficient series of operations which resulted in the roads being ready for use when needed. Incidentally, Pine Camp has more roads than any of the other cantonments under construction because it is necessary to have ample highway capacity to get the mechanized troops to the firing areas and maneuver grounds.

This armored division, similar to the Nazi "panzer" divisions, is completely mechanized. Nobody has to walk. The assembled unit occupies 91 miles of highway when on the move. Approximately 19,000 weapons constitutes the division's allotment and includes sub, light and heavy machine guns, pistols, rifles, 37 mm guns, 75 mm guns, 105 mm howitzers and chemical mortars. It takes 92,000 gallons of gasoline to fill the gas tanks of this division.

In command is Brigadier General Henry W. Baird, an expert in the direction of mechanized fighting equipment, and on him and his officers rests the responsibility of



It's like a . . . . .
One-Man "Blitz"
for speed in handling material

That is what they say about the Brooks LOAD LUGGER, It is a master of timing . . . it hoists, hauls and dumps the load while the ground crew is filling the empties . . . no delay, no time lost, no idle equipment. One LOAD LUGGER, operating with 5 to 10 dump buckets, will beat a fleet of ordinary trucks in the amount of yardage moved per day.

Test the LOAD LUGGER on the job . . . by our Special Introductory Offer.

Brooks EQUIPMENT AND MFG. CO.

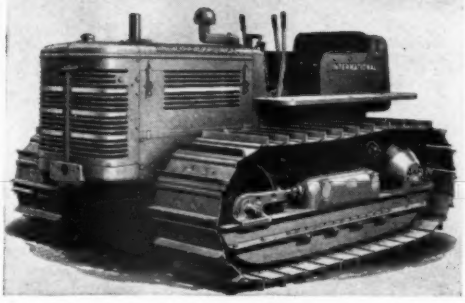
KNOXVILLE 309 Davenport Road TENNESSEE

Distributors in all Principal Cities

For your convenience in writing to Brooks Equipment and Manufacturing Company, you will find a card bound in this issue.

INTERNATIONAL T-6 TracTracTor

4-cylinder valve-in-head distillate or gasoline engine. Bore and stroke: 3⅞ x 5¼ in. Five forward speeds, from 1.5 m.p.h. to well over 5 m.p.h. Develops 32.9 drawbar h.p. on gasoline at 1,450 engine r.p.m. and 7,650 lbs. drawbar pull.



INTERNATIONAL T-9 TracTracTor

4-cylinder valve-in-head distillate or gasoline engine. Bore and stroke: 4.4 x 5.5 in. Five forward speeds, from 1.5 m.p.h. to well over 5 m.p.h. Develops over 40 drawbar h.p. on gasoline at 1,400 engine r.p.m. and over 9,500 lbs. drawbar pull.

LOTS OF PUSH AND PULL FOR THEIR SIZE

INTERNATIONAL T-6 and T-9 TracTracTors with Distillate or Gasoline Engines

GOOD THINGS come in pairs when you're in the market for medium-sized crawler tractors with gasoline engines. These International TracTracTors give you plenty of push and pull for their size. Both the T-6 and the T-9 *develop more drawbar pull than any other tractors in their size and power range.*

The T-6 and T-9 have the same dimensions as the popular TD-6 and TD-9 DIESELS. Both have all the time and money-saving features of modern TracTracTor design. For example, there's Tocco-hardening—which Harvester pioneered—in crankshafts and track rollers. The specially designed combustion chamber, providing smoother operation, longer engine life, and remarkable fuel economy, is another performance feature you'll appreciate.

Count on these two tractors to give you steady, economical performance. Look into the quick, efficient service behind them. See the nearest International Industrial Power dealer or Company-owned branch about these crawlers. Also four Diesel TracTracTors—TD-6, TD-9, TD-14, TD-18, five new International Industrial Wheel Tractors, and a complete line of International Power Units (sizes up to 110 max. h.p. for Diesel, gasoline, natural gas, and distillate operation).

INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue Chicago, Illinois

TYPICAL EQUIPMENT THE T-6 OPERATES

Bulldozers—6 to 7 ft. • Bullgraders—7½ to 8½ ft. • 2-wheel scrapers—2½ to 3½ yds. • Rollover scrapers—½ to 1 yd. • Blade graders—7 to 8 ft. • Front-end shovel—½ yd. • Cranes—1 ton @ 8-ft. radius • Towing winches—10,000 lbs. @ 100 ft.p.m. • Oil field winches—25,000 lbs. @ 40 ft.p.m. • Snow plows—8-ft. cut • Terracers (light)—8 ft. • Small logging arches and fire-line plows.

TYPICAL EQUIPMENT THE T-9 OPERATES

Bulldozers—6½ to 8 ft. • Bullgraders—8½ to 10 ft. • 2-wheel scrapers—3 to 4 yds. • 4-wheel scrapers—4 to 5 yds. • Rollover scrapers—1 to 1¾ yds. • Blade graders—8 to 10 ft. • Front-end shovel—¾ yd. • Cranes—2 ton @ 8-ft. radius • Towing winches—12,500 lbs. @ 100 ft.p.m. • Oil field winches—35,000 lbs. @ 35 ft.p.m. • Snow plows—8 to 9-ft. cut • Terracers—8 to 10 ft. • Pipe booms, lift @ 8-ft. overhang—5,500 lbs, • Small logging arches and fire-line plows.

INTERNATIONAL Industrial Power

molding men and machines into a speedy, forceful unit with exceptionally heavy fire power per man.

To provide adequate training space for this armored division, 75,000 acres have been added to the reservation, which will necessitate the construction of more shelter for men and machines and the installation of expanded utilities. Tacticians claim that the Pine Camp area offers an ideal training ground for practice in mechanized warfare, and are said to be particularly interested in the opportunities for winter maneuvers.

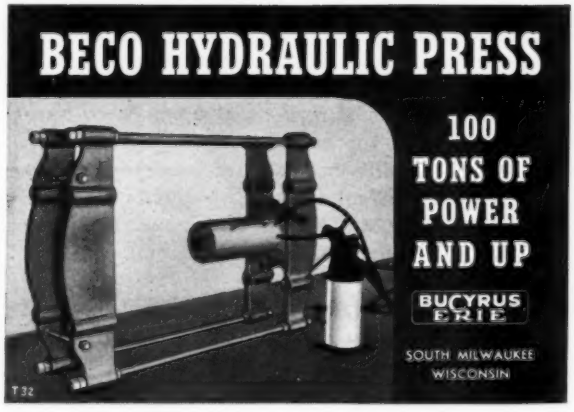
In charge of construction for the War Department was Gerald R. Tyler, Major, Q.M.C., constructing quartermaster. A. Bradford Squire was resident engineering director for Wm. S. Lozier, Inc. D. B. Neiderlander was construction manager; E. P. Palmer, advisory supervisor; J. J. Knudsen, assistant construction manager; Bruce Silverthorn, general superintendent of housing construction; J. F. Armstrong, general superintendent of utilities construction. L. J. Jerome was office engineer for Senior & Palmer, Inc.

• One of the Caterpillar-LeTourneau bulldozer units pushes fill into a low spot during general grading operations.

The John W. Cowper Company, Inc., recently erected the large Curtiss Airplane manufacturing plant at Buffalo, New York; built the new Calvert Street bridge at Washington, D. C., including the spectacular job of moving the old bridge to a new location; and has handled a number of large housing jobs.

Senior & Palmer, Inc., constructed the foundations for the Plank Road highway bridge across the Passaic River from Kearny, New Jersey, to Newark; did the foundation work on the Pennsylvania Railroad's new high level bridge across the Passaic River from Harrison, New Jersey to Newark; built the foundations under the bridge which carries the Merritt Parkway across the Housatonic River; and is justly famous for its many caison and other difficult work on sub-surface supports.

HAYWARD BUCKETS
PLAY SAFE . . .
CHOOSE HAYWARDS
Hayward Buckets won't fall down on the job, cause time out, or require costly repairs.
THE HAYWARD COMPANY
52-54 Church Street
New York, N. Y.



For your convenience in writing to the advertisers on this page, you will find a card bound in this issue.

Buckets of Profit with RED ARCH

A RED ARCH dragline bucket equipped with the new RED ARCH drag chain is a combination hard to beat. Faster digging, longer service, lower costs and surer profits are points every dragline owner is interested in . . . that is why every dragline owner will be interested in RED ARCH buckets.

Try a RED ARCH bucket and convince yourself that the streamlined construction eliminates excess weight; gives better balance for bigger loads; is faster dumping; has greater strength and durability —to save you money in every way.

A quicker fill . . . a smoother carry . . . a cleaner dump: these are performance features which place RED ARCH buckets in high favor with owners and operators alike. Because of their lighter weight, they often permit operators to use larger buckets on their present machine, thus moving more dirt per cycle!

Investigate RED ARCH yourself . . . soon. It pays . . .

Bucyrus-Erie

SOUTH MILWAUKEE, WISCONSIN

For your convenience in writing to Bucyrus-Erie Co., you will find a card bound in this issue.

Notes from the manufacturers

Macwhyte Wire Rope Company, Kenosha, Wisconsin, at a recent meeting voted Mr. Robert B. Whyte vice president in charge of operations. His connection with the wire and wire rope industry dates back to 1913 when he left Cornell with a sheepskin in mechanical engineering. In 1917 he resigned another position to become wire mill superintendent of Macwhyte Company. In 1925 he was made general factory superintendent and in 1937 he was elected a director.

The B. F. Goodrich Co., Akron, Ohio, announces several changes in the western organization according to W. S. Richardson, general sales manager of the mechanical goods division. A new California district is being formed, with headquarters at Los Angeles and a branch office in San Francisco, to include the present Los Angeles district territory and revised San Francisco district territory. L. L. Horchitz, who has been manager of the Los Angeles district since 1929, is named manager of the new district, with H. A. Schultz branch manager at San Francisco. W. D. Rigdon who has been manager of the San Francisco district is placed on the company's retirement list. C. M. Christensen has been named manager of the Denver district, succeeding Max Schmidt, who remains on the staff in an advisory capacity.

Chain Belt Company, Milwaukee, Wis., has just announced that Mr. J. Walter Snavely, district manager in the Houston territory for seven years, has returned to the sales department of the conveying and engineering products division at Milwaukee. Mr. Snavely graduated from the University of Wisconsin and entered the employ of Chain Belt Company as a student apprentice in the year 1927. Mr. W. A. Pitts, formerly representative in Oklahoma City, has been appointed district manager of oil well sales at Houston. Mr. George Hunt has been appointed district manager of industrial sales with headquarters at Dallas, Texas.

Peerless Pump Division of the Food Machinery Corporation have moved its Eastern offices and manufacturing facilities from Massillon, Ohio to a new and modern plant located at 1250 Camden Avenue, S. W., Canton, Ohio. Peerless Pump's new Canton plant, necessitated by very substantial defense pump orders and steady increases in national and international sales, makes available a total of approximately 55,000 square feet of floor space.

The Sullivan Machinery Company, Michigan City, Ind., announces the retirement on pension of Mr. Howard T. Walsh as of June 30, after forty-one years of continuous service. Upon graduation from Worcester Polytechnic Institute, Mr. Walsh joined the company, serving successively as an apprentice in the company's training course, salesman in the Denver territory, Pacific Coast manager, London manager, general sales manager, vice president and director.

The Rawlplug Company, Inc., 98 Lafayette Street, New York City, have placed Kenneth M. Anderson, with headquarters at 2115 South San Pedro Street in Los Angeles, in charge of Rawlplug-Los Angeles Company.

The Buda Company, Harvey, Illinois, has named G. D. Groce as general service manager it was announced by R. K. Mangan, executive vice president. Mr. Groce has been connected with the automotive industry in a manufacturing and engineering capacity for many years and during the past ten years, was service manager of the Cleveland Tractor Company.

"HERCULES" (Red-Strand) Wire Rope is made in a wide range of both Round Strand and Flattened Strand constructions — Standard or Preformed type.

There Is Extra Profit In Its Plus Value

USE "HERCULES" (Red-Strand) the next time you re-rope. You will soon discover the definite advantages of the Leschen manufacturing policies and methods, which leave nothing to chance. From the initial selection and tests of its materials, to the final inspection of the finished rope, each manufacturing detail is rigidly checked to assure long operating life.

Measure the extra value of "HERCULES" (Red-Strand) Wire Rope by the yardstick of performance. It will bring you extra profit, as well as help speed up your work. With wire rope, it pays to use the best.

MADE ONLY BY
A. LESCHEN & SONS ROPE CO.
WIRE ROPE MAKERS — ESTABLISHED 1857
5909 KENNERLY AVENUE — ST. LOUIS, MISSOURI, U. S. A.

NEW YORK • • • 90 West Street
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SEATTLE • • 3410 First Avenue South

For your convenience in writing to A. Leschen & Sons Rope Co., you will find a card bound in this issue.

AND "ALL ABOUT TRAILERS" *best describes this New Catalog*

YOU'LL WANT IT FOR YOUR FILES

WRITE TODAY

ROGERS BROS. CORP., 136 Orchard St., ALBION, PA.

New trade literature

Title: **"Personnel Management Hand-Book"**

Subject: A 200-page book containing 300 plans and tested methods used by large and small concerns to build better employee relations in a defense economy. Included among the more important topics discussed are tests for picking the best workers, getting your employees to pull together, how to prepare an employee manual, and plans for employee profit-sharing.

Where to Get: The Dartnell Corporation, Ravenswood and Leland Avenues, Chicago, Illinois. Offered free as a premium for a new or renewal subscription to American Business Magazine for one year ($3.75).

Title: **"Mining Directory of Minnesota 1941"**

Subject: Five main parts make up this year's issue and includes the following: Maps showing the name and location of all operating mines, mines that have been exhausted and reserve properties. Principal state and county highways are also shown. A list of all mines or mining properties having shipped, or that will be shipping, merchantable ore and interesting information about each. A list of the various mining companies and holding organizations, together with a list of their officials. A revised general statistics section on the iron ore industry and a partial list of men who are associated with the mining industry of the state.

Where to Get: University of Minnesota Institute of Technology, Mines Experiment Station, Minneapolis, Minn.

Title: **"Macwhyte Wire Rope"**

Subject: This wire rope catalog-handbook boasts of many new additions helpful to wire rope consumers and lists more than 1000 ropes. It is sectionalized for quick reference with a tabbed index and table of contents for each section. "Streamlined information" has been added to pages of tables and 60 pages of general information are included. Contains 170 pages in all.

Where to Get: Macwhyte Company, Kenosha, Wisconsin, or its distributors. Free upon request, ask for catalog G-14.

Title: **"Arc Welderule"**

Subject: Operates in a manner similar to a slide rule. Reads directly the length of arc weld joints obtainable per 100 lb. of electrode, also the pounds of weld metal deposited per 100 lbs. of electrode. Covers 11 different commonly used sizes and types of joints; also 22 different popular electrodes in both the 14 and 18 inch lengths. Vest-pocket size. Has a selector chart which shows the various filler metal classifications as specified by the American Welding Society and the type of electrodes which meet these classifications.

Where to Get: Any local G-E Arc Welding Distributor, G-E sales office, or General Electric Company, Schenectady, N. Y. Free upon request.

Title: **"Joyce Jacks"**

Subject: Handy size 36 page catalog with illustrations and complete specifications of 289 different models and sizes of jacks ranging from 1½ to 100 tons lifting capacity.

Where to Get: The Joyce-Cridland Co., Dayton, Ohio. Free upon request, ask for catalog No. 300.

Title: **"34E Twinbatch Paver"**

Subject: A descriptive analysis featuring a triple pull-out spread illustrating the paver. Many mechanical advantages are fully illustrated and described. Of special interest to the contractor is the illustration on page 7 presenting the flow of the batch from the skip to the bucket. Many other illustrations help the contractor

SEALED & 'ALEMITE' LUBRICATED CENTER SHAFT BEARINGS
LIGHTER ALLOYS USED, ELECTRICALLY WELDED FOR STRENGTH WITH LIGHTNESS
ADVANCED DESIGNS AFFORD INCREASED CAPACITY
SPECIALLY SHAPED COUNTERWEIGHTS PUSH MATERIAL AWAY FROM SHEAVES & CABLE
EXCEPTIONAL CLOSING POWER FACILITATES HARD DIGGING
DROPPING SHOCKS ABSORBED BY PATENTED STOPS

Outstanding Features

A few of which are mentioned herewith combine to make Owen buckets produce "A Mouthful at Every Bite and More Bites per Day," with long periods of service and freedom from repairs.

OwenBuckets

THE OWEN BUCKET COMPANY

6095 BREAKWATER AVE. • CLEVELAND, OHIO

BRANCHES: New York, Philadelphia, Chicago, Berkeley, Calif.

For your convenience in writing to the advertisers on this page, you will find a card bound in this issue.

visualize all the important advantages of this machine.

Where to Get: Koehring Company, 3026 West Concordia Avenue, Milwaukee, Wis. Free upon request.

Title: **"Lifting Jacks"**

Subject: A newly revised data book on industrial jacks. Containing 64 pages of useful reference material, the book lists equipment for every type of lifting, lowering, pushing and pulling application. Specifications are given on the complete line of over 300 types and sizes of jacks. A feature of the book is a time-saving comprehensive index listing every jack.

Where to Get: The Duff-Norton Manufacturing Company, Pittsburgh, Pennsylvania. Free upon request, ask for catalog 200.

Title: **"The Load-Packer"**

Subject: An illustrative and descriptive presentation of this unit's adaptation for different uses. A section is devoted to special economical and sanitary features.

Where to Get: Gar Wood Industries, Inc., Detroit, Michigan. Free upon request, ask for bulletin No. 27.

Title: **"Hydraulically Controlled Shovel"**

Subject: In a bulletin just released by the Harnischfeger Corporation of Milwaukee, the P&H Model 855 shovel with its new hydraulic control system is described in interesting detail. How the machine can be quickly and simply converted from shovel to dragline, crane or clamshell and further important details may also be found.

Where to Get: Harnischfeger Corporation, Milwaukee, Wisconsin. Free upon request, ask for bulletin X-20-1.

Title: **"Brown Control Accessories for Pneumatic Controllers"**

Subject: Practical manual for the man whose job it is to specify and order control accessories for pneumatic controllers. Besides concise descriptions and dimension tables, the bulletin contains schematic diagrams, sizing charts for gas, liquid flow, steam valves and table of shipping weights for the various items.

Where to Get: The Brown Instrument Company, Wayne and Roberts Avenues, Philadelphia, Pennsylvania. Free upon request, ask for bulletin No. 89-14.

Title: **"Plane-Strain Distribution of Stress in Elastic Media"**

Subject: An analysis of stresses and displacements in a semi-infinite elastic medium; its practical application is in soil mechanics. The analysis approximates the condition present when an earth fill or highway embankment is placed on level or sloping ground.

Where to Get: Iowa Engineering Experiment Station, Iowa State College, Ames, Iowa. Free upon request, ask for bulletin 148.

Title: **"Twenty-fifth Anniversary Book"**

Subject: Devoted to the complete line and manufacturing set-up of the Donaldson Company, makers of air cleaners. Profusely and interestingly illustrated.

Where to Get: Donaldson Company, Inc., 666 Pelham Blvd., St. Paul, Minn. Free upon request.

Title: **"Improved Paver"**

Subject: Improvements in the Ransome 34-E Single Drum Paver are fully illustrated and described in an eight page, two color bulletin just released. Features are headlined, illustrated and fully explained — specifications are complete in every respect with line drawings showing principal dimensions and power transmission arrangement.

Where to Get: Ransome Concrete Machinery Co., Dunellen, New Jersey. Free upon request, ask for bulletin No. 179.

Title: **"Sullivan Mine Car Loader"**

Subject: New bulletin covering the Sullivan HL-2. Operating, loading and construction features along with other interesting details are discussed.

Where to Get: Sullivan Machinery Company, Michigan City, Indiana. Free upon request, ask for bulletin 76-L.

BARGAINS IN USED EQUIPMENT

FOR SALE, RENTALS, BUSINESS OPPORTUNITIES, TRADES, ETC.

To the reader wishing to advertise used equipment in the "For Sale" Section: All advertising in this section is payable in advance. Enclose your check or money order with copy. Rate: 60c per line. Minimum charge $2.40. No discounts; no commissions. If no change in copy is desired, three continuous insertions are offered for the price of two. Read these instructions carefully. Each line contains 41 characters (34 characters if all capital letters are used). Count spaces and punctuation as one character each. Allow 10 characters for box number, if blind advertisement is desired. Count your own copy to save delay. Holding up your advertisement one month to secure approval of revised copy or an additional remittance may cost you real money in a lost sale. Be sure to enclose the correct amount of money with your order. Closing date—15th of preceding month. Example: January issue closes December 15th.

To the reader wishing to answer "For Sale" Section advertisements appearing on these pages: Be sure to address your inquiry to the advertiser by using the correct box number. Mail your letter in care of Excavating Engineer, South Milwaukee, Wisconsin. Write each advertiser a separate letter. Do not write us for name and address of advertiser. This information will not be given out. We have no information about the equipment advertised other than that shown in the advertisements themselves.

SMALL SHOVELS, CRANES AND DRAGLINES

Up to 2½ Cubic Yards

BUCYRUS-ERIE GA-2 High Lift 1 yd. Shovel. Waukesha WS engine. Single Shaft Cats. Operating condition. Located eastern Pennsylvania. Box 2776

BUCYRUS-ERIE GA-2 Gas-Air high lift shovel. 24' boom. 18'4" dipper handle. 1¼ yd. dipper. Waukesha 6¼"x8" 4-cylinder engine. Electric starter. Quantity spare parts included. Excellent condition. Located Eastern Pennsylvania. Box 2774

MARION Model 361. 1½ yard gas shovel. Also 50' boom clamshell equipment. Electric starter. Buda engine. Located Connecticut. Box 2808

BUCYRUS-ERIE 37-B. Gas—60' boom clamshell with Rudomatic tagline. Electric starter. Located Connecticut. Box 2807

BUCYRUS-MONIGHAN MODEL 2-W Diesel dragline. 70' boom. 1 2½-yard Page drag bucket. 1 2½-yard Bucyrus-Erie drag bucket. Engine overhauled March 1941. Excellent condition. Located Southern Illinois. Box 2780

P&H MODEL 206. ¾-yd. shovel in good operating condition, or will trade for ⅝ or ½-yd. crane, truck or crawler mounted. Paul Borchardt, Highland Park, Illinois.

LORAIN 40 with one purpose trailer. Two years old. ¾-yd. Shovel and backhoe attachments. In tip top working order. Located Indiana. Box 2779

BUCYRUS-ERIE 34-B 1¼ yard gas shovel. Also 60' boom clamshell equipment with Rudomatic tagline—new. Good condition. Located Connecticut. Box 2805

BUCYRUS-ERIE 37-B D-11000 caterpillar diesel 1½ yard shovel. Also 60' boom clamshell equipment. Located Connecticut. Box 2806

Dragline-Crane For Rent

READY TO WORK. K44 Link-Belt crawler dragline-crane. 55' boom, 1¾-yd. drag bucket. Crane capacity 25 tons at 12'. Light Plant. Located Iowa. Box 2798

LORAIN MODEL 60 1 yd. Gas Shovel. Waukesha engine. Machine generally overhauled few months past. Operating condition. Located Minnesota. Box 2743

BUCYRUS-ERIE 46-B with 1½-yd. bucket and 2½-yd. bucket, Kohler light plant, 75 ft. boom, 6-cylinder Buda diesel engine with electric starter. Located Southeast Missouri. Box 2783

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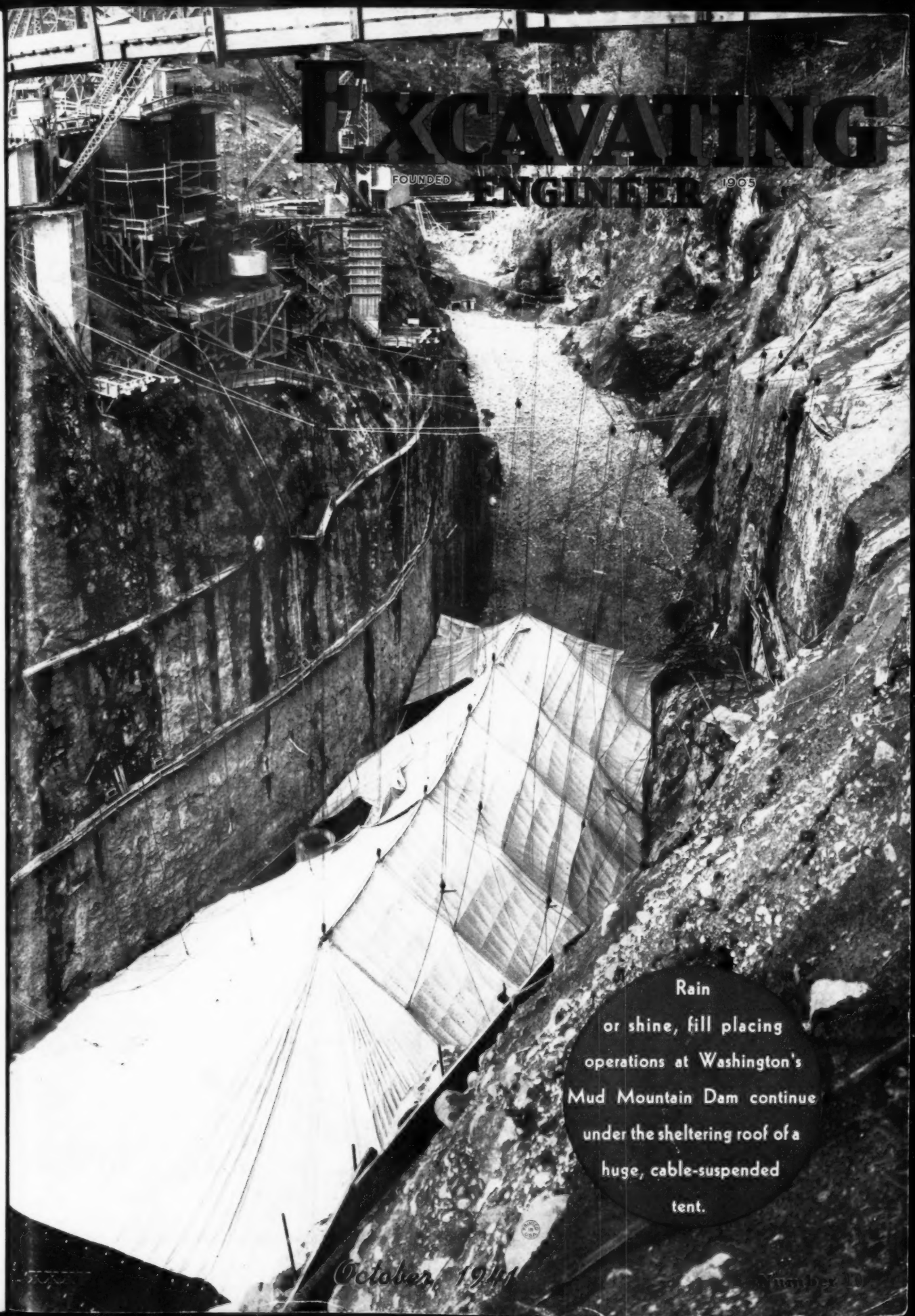
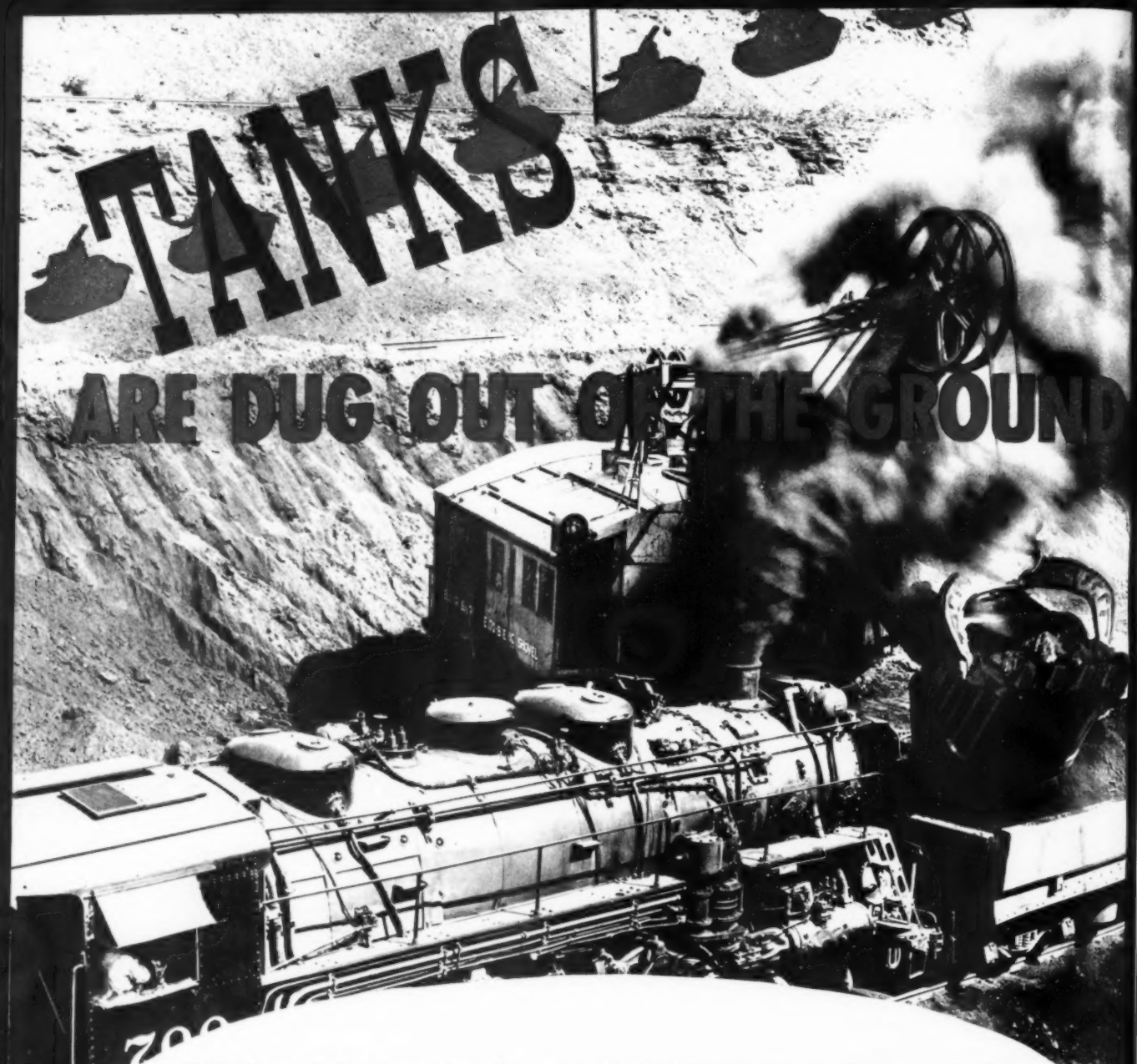

EXCAVATING
ENGINEER
FOUNDED 1905
Rain
or shine, fill placing
operations at Washington's
Mud Mountain Dam continue
under the sheltering roof of a
huge, cable-suspended
tent.
October, 1941



IRON ore is the start of tanks, guns, battleships, trucks . . . Defense. In the United States, iron ore means the great Mesabi Range, and that means Bucyrus-Erie. More Bucyrus-Eries are used in the mining of iron ore than all other makes of excavators combined. There's a reason — Bucyrus-Erie's ability to handle both stripping and loading at lowest cost per yard.

The EXTRA quality built into every Bucyrus-Erie not only means low cost operation, it means ability to meet the sustained high-speed requirements of Defense. That's why you will find Bucyrus-Eries of all sizes and types at work on direct and indirect defense jobs all over the country. That's why it will pay you to be able to count on Bucyrus-Erie performance for your future work. Bucyrus-Erie Company, South Milwaukee, Wisconsin.

BUCYRUS ERIE

EXCAVATING, DRILLING AND MATERIAL HANDLING EQUIPMENT

THE GROUNDWORK OF DEFENS

EXCAVATING ENGINEER

FOUNDED 1905

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Confronted with completing Mud Mountain Dam before this year's autumn rains, Contractor Guy F. Atkinson adopted a 24-hour operating schedule and put a canvas roof over his fill area to insure continuous operations on the world's largest earth fill structure. Watch for an article on this project in an early issue.

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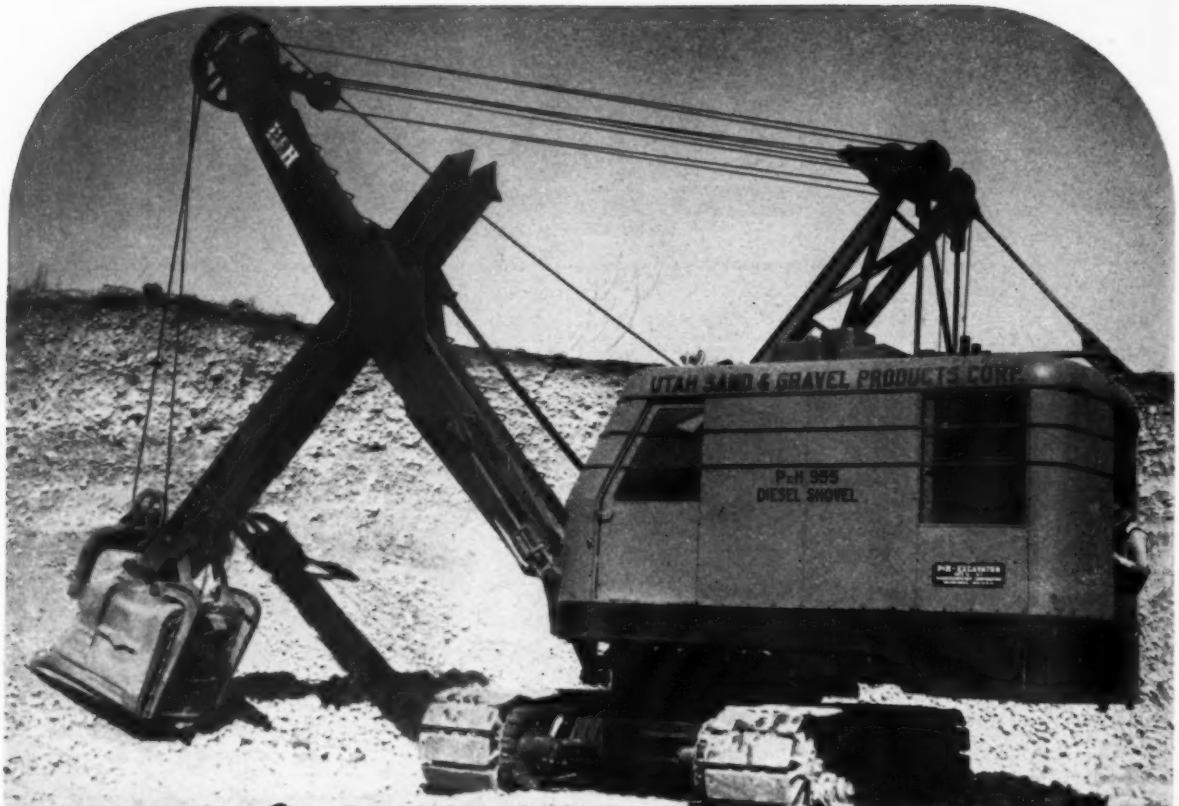

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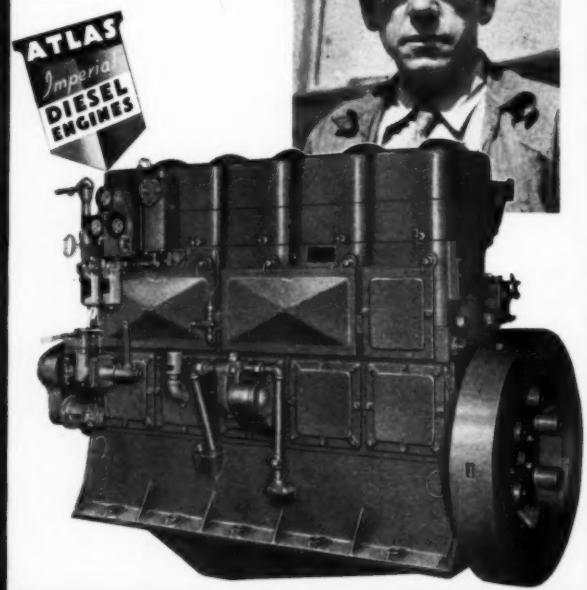
L. D. Mortensen, Evanston Superintendent for the Utah Sand & Gravel Products Corporation.



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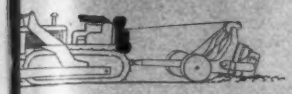

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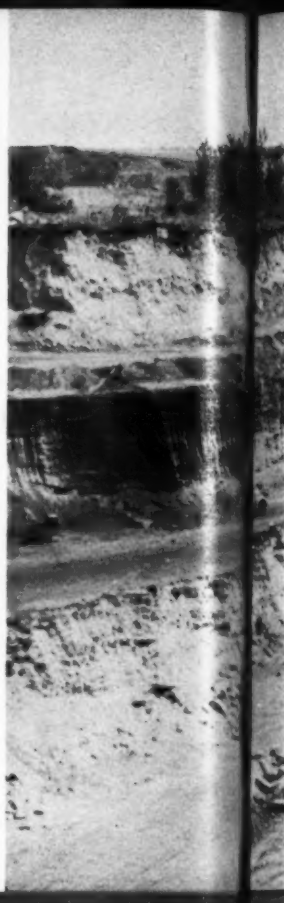
DIGGING MESABI

Evergreen Mines Company's Argonne Mine is typical of the many smaller operations on the Mesabi Range that are producing their share of ore for America's defense program through the efficient employment of modern methods and equipment. Mine Superintendent Hugh Leach takes us on a tour through the Argonne operations

By **HUGH LEACH**
Superintendent, Argonne Mine

NORTHERN Minnesota's Mesabi Range abounds with natural beauty. But deep beneath its scenic woodlands lies a treasure far more practical for America's defense needs. Iron ore is found here — a long, irregular strip of it, striking northeast through Itasca and St. Louis counties for a distance of 100 miles. This is the United States' greatest iron ore producing region and its greatest reserve. Here we find trains, trucks, and power shovels of all sizes and make working night and day to reclaim the contents of this natural treasure chest. This tumult of activity finds its sequel these days in tanks, bomber and fighter planes, big guns and the deadly missiles they fire, and in machinery to make these and other weapons of modern war.

Millions of tons of iron ore are needed this year to keep filled the blast furnaces from which it flows as iron into the throbbing arteries of an industry that is frantically attempting to satisfy the greatest demand for tools and munitions this world has ever seen. Iron ore is the red corpuscle in the blood stream of America's defense industry. There is no "ersatz" for iron, and on the "Range" every available digging and conveying contrivance has been maneuvered



• General view of the Argonne's No. 1 pit showing two Bucyrus-Erie shovels at work. The 34-B on top is stripping while the 37-B below is loading out ore. Inset: Hugh Harrison, district superintendent (left) and Hugh Leach, superintendent and author of this article.

RANGE IRON ORE

• Low grade ore is converted into merchantable quality by the Argonne Mine's completely equipped washing plant. Note the Athey Mobiloader working on the concentrate stock pile in the foreground.

into the working front to provide a steady flow of ore to the mills. New, existing, and abandoned ore bodies are being subjected to unusually heavy activity. Exploration drills hie off into the woods on prospecting expeditions in search of new beds of ore. There will be no bottleneck here. Tonnage records have been broken every month this year, and if present indications are any guide, a new season record will be set, with shipments from the Mesabi Range alone up over the 50 million ton mark.

Mesabi Range Geology

A few words on the geology of the range may serve to clarify the mining problems involved in moving this tremendous volume of ore. Mesabi ore occurs in flat lying deposits, varying widely in size, both laterally and in depth, which lie as pockets in a lean ore country rock (locally called "taconite") known as the Biwabik formation. Originally, this iron bearing formation out-cropped over most of its 100 mile length, its width ranging from one to three miles, but a few glaciers came along about 20,000 years ago and covered it with a layer of glacial drift from a few feet to more than 200 feet deep. This drift, in places where it isn't too deep, can be stripped off and the exposed ore mined by open pit methods. If too deep for economical pit mining, underground methods are used. In its early years, many underground mines were operating on the range, but with the exhaustion of these deeper lying ore bodies and developments in stripping equipment and methods, more and more open pits have been dug, till at present most of the Mesabi ore is produced from open pit mines.

Underground mines dug in the future will be in the minority because, with the developments in mining methods that the range has seen in the last few years,

• "Ernie" Young of Minneapolis holds the stripping and ore moving contract at the Argonne Mine.

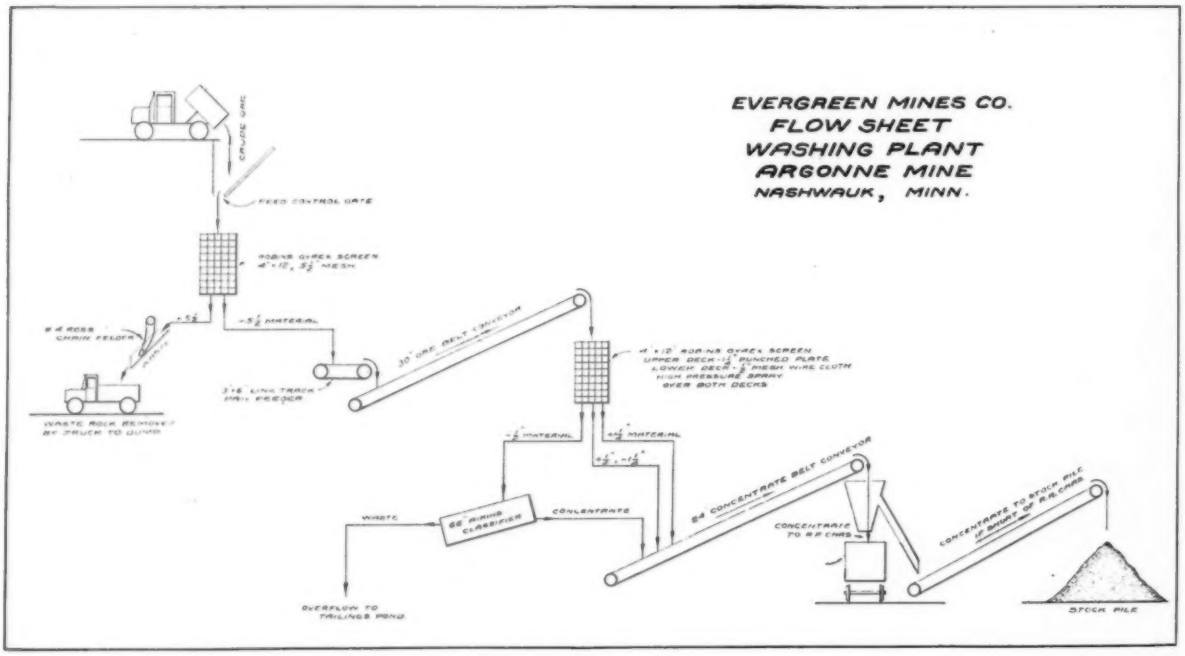
much of what was once considered underground ore will be mined in pits. The introduction of truck and belt conveyor haulage has lowered stripping and mining costs to such an extent that the allowable stripping to ore ratio has been greatly increased, and overburden once thought too deep to be profitably removed can now be stripped off to expose the ore. Not only has this made accessible the deeper lying ores, but it has made available ore bodies hitherto considered too small to be economically mined by rail haul methods. It has also made possible a more thorough cleaning out of the present pits, as trucks and small shovels can follow the ore into corners or at depths where locomotives, due to lack of space or prohibitive grades, can't operate. Trucks, alone or in combination with conveyor systems, are being used this year on several properties to strip and mine ore left behind in old underground operations — conclusive proof that these new methods can to a large extent replace underground mining on the Mesabi Range.

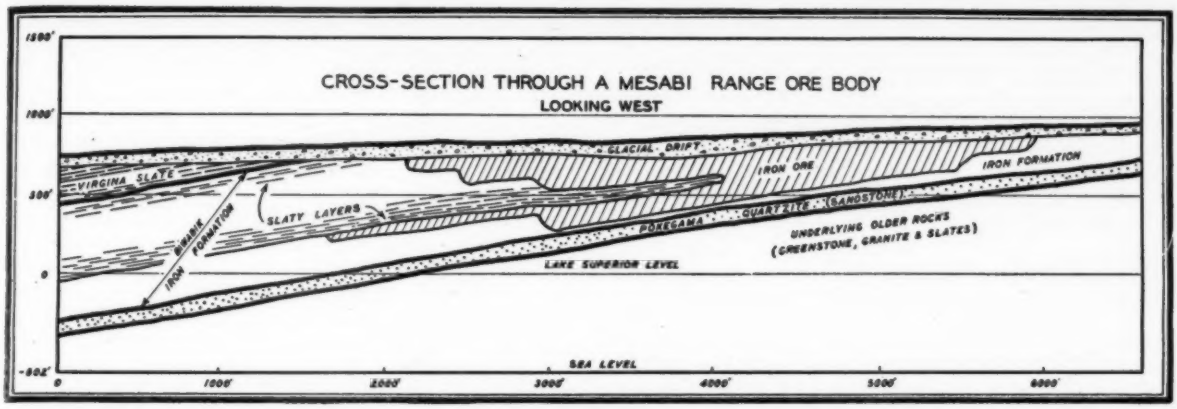
This is a good year for operators, large and small, on the Mesabi and they are responding to the demand for ore by opening up many new properties, all of them using trucks to move their ore.

Typical of these small truck haul operations is the Argonne Mine, located on the Range midway between Nashwauk and Keewatin in Itasca county. This property is operated by the Evergreen Mines Company with home offices in Crosby, Minnesota. The Argonne ore body is geologically typical of those on the Mesabi. It measures about 1000 feet east-west and 500 feet north-south, varying in depth from 70 to 100 feet. Overburden is shallow, ranging from 20 to 35 feet. The northern half of the deposit lies directly under the glacial drift, but the southern half is overlain by a bed of lean paint rock, averaging 15 feet in thickness. Formerly known as the Argonne Reserve, it was explored by drilling and test pitting back in 1911. These original explorations disclosed a small isolated deposit of good wash ore, estimated to contain about 400,000 tons. However, at the time of its discovery the mining companies' interests lay in the larger ore bodies that could easily be mined by locomotive haulage. Truck haul at that time was unheard and unthought of. So the Argonne has lain untouched through the intervening years, waiting for modern mining methods and the needs of industry to bring it into production.

Back in 1935 trucks were first used to move ore from mine to shipping cars. Methods and equipment have been constantly improved since then. And last year, as this nation's industries went into high gear, it became evident that more ore would be needed than had ever before been produced. The set-up was complete—the Argonne was ready to go, and the Evergreen Mines Company immediately started operations. The fall of 1940 was spent in drilling to check the original holes and to further outline the ore body. This was done with a Bucyrus-Erie

• Flow sheet of the washing plant at the Argonne Mine showing the operations necessary to concentrate the low grade ore into merchantable material.





• This typical cross-section through a Mesabi Range ore body shows why stripping operations are increasing in scope. (Reprinted courtesy of Skillings' Mining Review.)

27-T churn drill, powered with a LeRoi gasoline engine. Six-inch holes were cased through the drift and sampled for every five feet in ore. While the drilling was going on the property was surveyed, contour maps and sections prepared, dump, plant, and tailing pond sites laid out. Preliminary surveys were made by the Great Northern Railroad in preparation for laying a spur track into the mine. By the last of December, this work had been carried far enough along so that stripping operations could begin.

Stripping Operations Get Underway

The stripping and ore moving contract at the Argonne Mine was let to E. A. Young, of Minneapolis. Equipment was moved on to the mine site the last week of December, 1940, and the dirt has been flying ever since. The "man at the throttle" in the organization is Mr. Young himself—"Ernie," to all who know him. Ernie has a reputation on the range as a contractor who will tackle anything, and the fact that he's still in the business and going strong is proof enough that he makes a go of the tough ones. When told he had four months to uncover some ore, he said he'd have 'er ready, and he did. He moved over 300,000 yards of overburden in those four months, most of it with a Bucyrus-Erie 34-B 1¼-yard shovel, and Ford trucks, equipped with 3½-yard boxes. He faced tough digging and cold weather in January and February and averaged over 70,000 yards per month. In March a new Bucyrus-Erie 37-B 1½-yard shovel arrived and production went up to 78,000 yards, with 89,000 yards moved in April. He had ore, lots of it, uncovered and ready to be loaded by the time mine and mill were ready to go.

The overburden consists of sand, gravel, clay and boulders. A large part of it was dug without blasting, but a combination of frost and clay finally made the digging too tough and blasting became necessary. All blasting in the pit is done by the mining company. Gopher holes were dug along the toe of the banks, two crews of men each being employed on this work. Holes were dug to a depth of 20 feet and loaded with 5"x16" sticks of Hercomite 25% gelatin. Electric detonators were used. Only enough powder was used to shake and loosen the bank; no attempt was made to bring it down. By keeping the bank well loosened in this manner, overhangs were avoided, and the stripping was successfully removed in one full cut. A number of large granite boulders were encountered, too big to be loaded into the trucks. These were successfully handled by a Caterpillar D-8 tractor, mounting a LaPlant-Choate bulldozer. On frozen ground the boulders skidded along easily and were shoved up the approach and out onto the dump, thus eliminating secondary blasting. This method of getting rid of the boulders was very cheap and satisfactory as long as the ground was frozen. However, when the frost went out of the ground in the spring, it was found that this scheme was too rough on the

• Preparing the charge in one of the horizontal blast holes to "loosen" ore, a blaster loads tamping bags while the other charges and stems the 6-inch hole.

• Above: Spoil leveling operations at Argonne's pit No. 2 are handled by a Caterpillar - mounted LaPlant - Choate bulldozer.

• Left: Six-inch exploration holes are put down by a Bucyrus-Erie 27-T blast hole drill.

• Below: Car loading and stockpiling operations at Argonne find the 3½-yard Athey Mobiloader a convenient handyman.

roads, and it had to be abandoned. The boulders were 'dozed into piles, broken by bulldozing (local term for mud-capping), using 60% gelatin, and loaded out. Although a considerable number of these large boulders were uncovered, their number was not considered sufficient to make it worthwhile to obtain a compressor and machines for drilling them, as the cost of equipment and labor would more than offset the saving in powder.

The overburden was hauled to a stripping dump located northeast of the pit on land well off the ore body. This area was first test drilled to determine whether or not it contained ore. Two dump men per shift direct the disposal of the dirt which, if dry, is dumped over the edge of the fill. Much of the overburden was too wet to be dumped in this manner, but it was disposed of by dumping short, using the bulldozer to push it over the edge.

Concentrating Argonne Ore

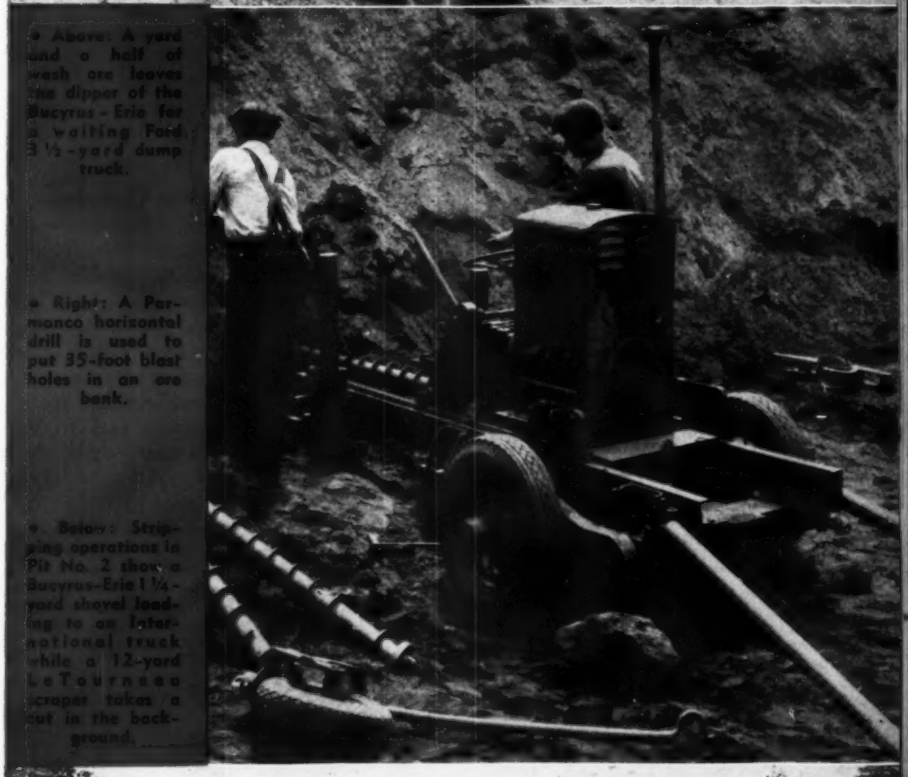
The Argonne ore is low grade, what is known on the range as a straight wash ore, and must be concentrated before shipping. Concentration is easily effected by washing out the lean siliceous material which is very fine grained, thereby raising the iron content of the concentrate, consisting of particles plus 80 mesh, to that of a merchantable ore. For this purpose, a washing plant was constructed, about 500 feet south of the pit. Due to the low-lying nature of the ground at the site of the mill, a fill averaging ten feet in thickness was necessary over this area. Stripping material was used for this purpose. The fill was laid down in two foot lifts, compacted by running over it with the trucks. Care was taken to bulldoze off all snow that fell before the dirt was dumped. This resulted in minimum settling of the fill in the spring as the ground thawed out. Plant construction was begun as soon as the fill at the site was completed. It is an all wood structure, built under contract by the Mesabi Construction Company of Hibbing, Minnesota. Equipment was installed by the Evergreen. The plant is simple both in construction and operation. The flow of

materials is, briefly, as follows: The trucks, hauling four to six tons, dump on a ramp over a 4'x12' Robins Gyrex screen, 5½" mesh. The oversize, amounting to about 7-10% of the crude ore, is rejected and hauled by truck to the waste rock dump. The undersize is fed onto a 30" conveyor which elevates the ore up to a 4'x12' Robins double-deck screen fitted with 1¼" and ½" mesh screens. Here the crude ore is washed by two banks of high-pressure sprays. The screen plus products are a concentrate, and are conveyed to the concentrate hopper over the loading track. The minus ½" material goes to a 66" Akins Classifier, producing a rake product which joins the screen product on the concentrate belt. The Akins overflow constitutes the mill tails, and is piped to the tailings pond.

The tailings pond covers about 30 acres and was formed by enclosing a low area south of the mill with a dyke 20 feet wide on top, averaging 15 feet in height. Material for this fill was hauled by truck from the stripping operations. Wash water for the mill is pumped from this pond by a 1600 gallon Ingersoll-Rand centrifugal pump. To handle the pond loss due to evaporation and seepage, a 160-foot well was drilled on the property by the Layne-Western Co., of Minneapolis. A Layne-Bowler deep well pump lifts about 200 gallons of water per minute, which amply fills make-up water requirements.

While plant construction and stripping operations were in progress, the railroad brought in its spur track to the mine. Contract for about three quarters of a mile of subgrade was let to Rudd and Freiberger, contractors of Duluth, Minn. Dirt moving equipment on this job consisted of a 1½-yard Lima shovel and three 4-yard International trucks. A drainage ditch from the track to the tailings pond was dug with a 1-yard Northwest dragline. The subgrade was finished up to the plant site—from this point on the Evergreen put in the fill. The tail track fill containing about 100,000 yards of stripping rises on a 1.5% grade from a height of 15 feet at

(*Continued on page 588*)



Above: A yard and a half of wash ore leaves the dipper of the Bucyrus-Erie for a waiting Ford 3½-yard dump truck.

Right: A Parmanco horizontal drill is used to put 35-foot blast holes in an ore bank.

Below: Stripping operations in Pit No. 2 show a Bucyrus-Erie 1¼-yard shovel loading to an International truck while a 12-yard LeTourneau scraper takes a cut in the background.

Rock Chapel Ag

A visit to Consolidated Quarries Corporation's Rock Chapel plant, one of the largest crushed stone organizations in the South, finds men and machines busy producing aggregate for defense needs

By JOSEPHINE T. SEVERINGHAUS

THE ROCK CHAPEL plant of the Consolidated Quarries Corporation, one of the largest crushed stone plants in the South, is located four miles from Lithonia, Georgia, and twenty-three miles from Atlanta. It is within sight of Stone Mountain, seven miles away, and like that famous dome, the rock is a granite gneiss.

Executive control of the corporation is in the hands of A. F. Hyde of New York City, chairman of the board; G. A. Austin, president, with offices in Decatur, Georgia; A. B. Kirkman, sales manager; and A. G. Loomis, secretary-treasurer. The purchasing, billing, payrolls and cost accounting are all done at the plant offices at Rock Chapel, by K. D. Howington.

Since beginning operations in 1929, the plant has furnished stone for highways, ready-mix plants, building projects and railroads. During the past few years, it has supplied stone for housing projects in Atlanta including Techwood, Capitol Homes, Grady, Howell, and others. Right now, the quarry is providing stone for defense purposes, such as aggregate and paving material for the airport at Camp Gordon twenty miles away. A three-mile spur of the Georgia Railroad out of Lithonia carries the corporation's product to main railroad lines.

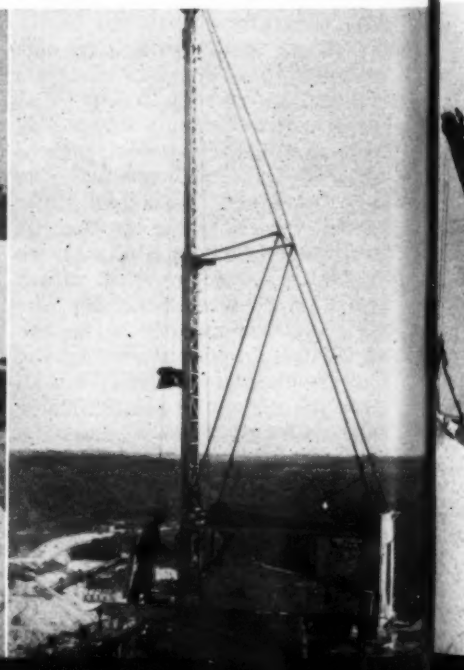
The face of the quarry is 140 feet high and 1,200 feet long. The 600-foot advance from the first working to the present face represents twelve years of operation with a total of over three million tons of stone.

Blast Hole Drilling Operations

Drilling is done with two churn drills, one a Sanderson Cyclone No. 14 and the other a Bucyrus-Erie 27-T installed last year. The drills put down 6⅝-inch blast holes thirty-five feet apart, generally 17 feet back from the vertical face. The tool strings weigh 1,500 to 2,000 pounds and drilling speed is approximately 2½ feet an hour. The bits make six to eight feet of hole before they are resharpened at the bit shed on the quarry floor by a Bucyrus-Erie bit sharpener. Drill men cap the holes with cement and mark the depth to keep the holes in prime condition until they are ready to be loaded. DuPont Nitramon in cans blasts the holes with 20,000 pounds loaded for an ordinary shot. As for the result in simple arithmetic, one-third of a pound of Nitramon usually equals one ton of stone brought down for the power shovels.

Rocks that come down too big to handle are drilled by eight Ingersoll-Rand jackhammers and blasted with Hercules Gelamite dynamite. The pop-shots are set off at the end of shifts to avoid moving men or machinery during working hours. A Bucyrus-Erie 100-B shovel takes up the job here, loading the stone into trucks. Clyde Pearce, one-time erector and operator for the Bucyrus-Erie Company, operates the shovel and handles about 150 tons of rock each hour. A Bucyrus-Erie 43-B diesel-powered shovel was recently added to the Rock Chapel equipment line up, replacing a ¾-yard Marion which was transferred to stockpiling. Five Mack trucks carry the stone to the crusher in semi-trailers.

These specially-built trailers have a capacity of 12 yards and were developed by Nelson Sever-



• Left: Recent plant changes called for the services of a Bucyrus-Erie ⅜-yard shovel to excavate a trench for a conveyor tunnel. Right: Perched high atop a quarry ledge, this Bucyrus-Erie 27-T puts down 6⅝-inch blast holes 35 feet apart.

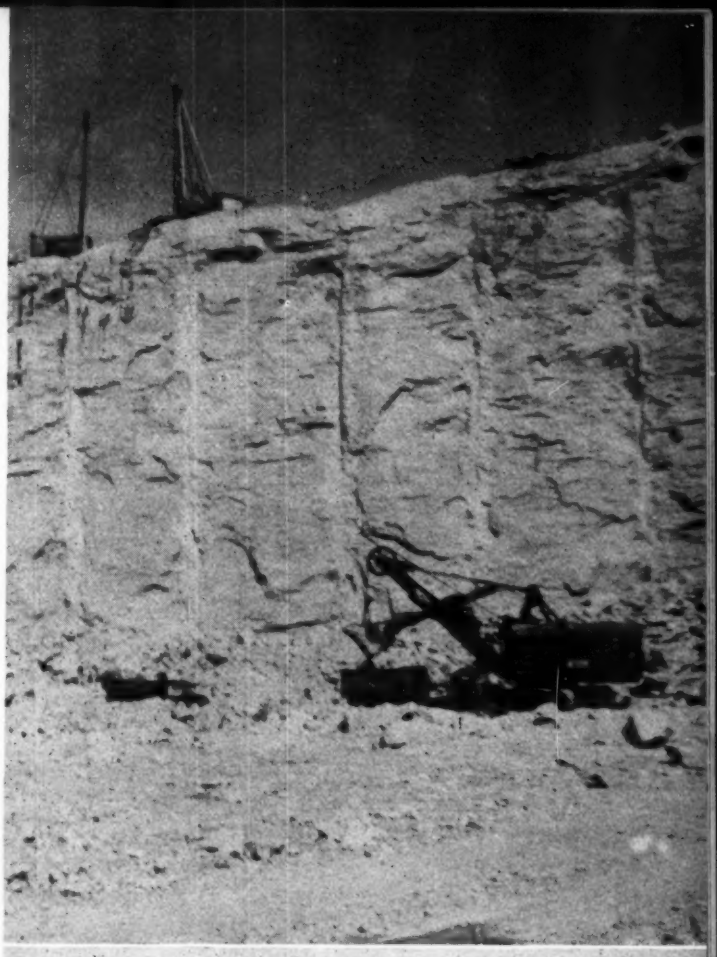
egate

inghaus, superintendent. They were built under his direction in the machine shop, and the design is patented by Consolidated Quarries Corporation. Each unit is dumped by a Curtis pneumatic hoist. The truck haul from the shovels to the crusher is 1,000 feet and will be shortened when the crusher is moved closer to the face where a new pit is ready to receive it.

The crusher is a 60x48 Allis-Chalmers jaw, with 200 horsepower electric motor drive. The crushed rock is carried on a 42-degree belt conveyor to the secondary crusher, a 20-inch Superior McCully. Concrete foundations have been poured for an additional duplicate crusher in the same building, and for belt conveyors to store and return larger sizes to the Symons 4-foot cone recrusher.

Traveling over a moving belt with its head puller 70 feet in the air, the stone goes to the screen house where two Allis-Chalmers 60-inch by 20-foot rotary screens, including two Hummer Vibrators and one Robins Eliptex, separate it into seven sizes, ranging from 2 to 8-inch mesh. The stockpiles are situated over a concrete tunnel with a steel door under each pile. Through these, stone of a desired size or mixture of sizes can be drawn onto moving belts which carry it toward the loading belt. Dropping onto this belt, the

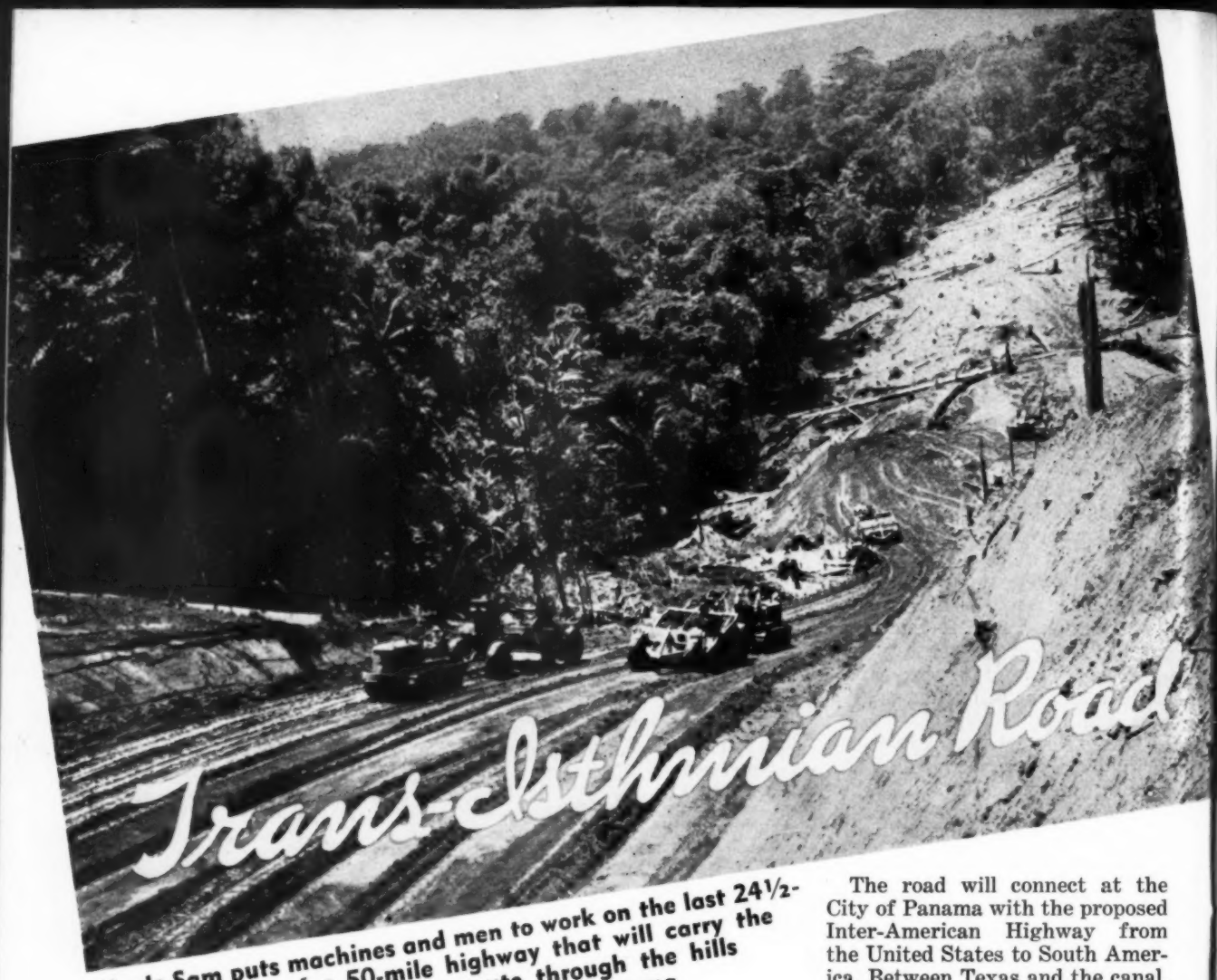
(Continued on page 594)



• Right: Blasted rock is loaded to specially-built 12-yard trailer trucks by the Bucyrus-Erie 100-B while a Bucyrus-Erie 27-T and a Sanderson Cyclone No. 14 place blast holes along the quarry face for the next shot.

• Right, bottom: The finished product, on its way to take a part in Uncle Sam's defense program, leaves the Rock Chapel plant in the background.

• Below: Large stock piles for emergency needs keep this Bucyrus-Erie 20-B busy stocking additional aggregate.



Uncle Sam puts machines and men to work on the last 24½-mile section of a 50-mile highway that will carry the proposed Pan American route through the hills and jungle of the Isthmus of Panama

UNDER the blazing tropical sun by day and under electric lights at night, 1,000 men toiling six days a week are constructing a highway across the Isthmus of Panama. Aided by scrapers and power shovels, by next spring these men will have completed a modern highway 24½ miles through hills and jungle from a point near the Fort Randolph Road in the Canal Zone to Madden Dam. Built for safe use at speeds of 60 miles per hour, the highway and its bridges will safely carry a 55-ton tank.

This section of highway is a section of the 50 mile Trans-Isthmian Highway which will connect Colon on the Atlantic end of the Panama Canal with Panama City, on the Pacific end. Most of the highway that it was practical to locate within the Canal Zone has been built. Now the United States is constructing the remaining 24½ miles of highway, most of which is located within the Republic of Panama. All of the highway is on the South American side of the Canal.

The entire Trans-Isthmian Highway is being constructed under an agreement with Panama. Panama furnishes all rights-of-way and deposits of local materials.

This Trans-Isthmian road has been increasingly in demand since the opening of the Panama Canal in 1914. Under an agreement with the Republic of Panama, a U. S. Government unit, the Public Roads Administration of the Federal Works Agency, is in charge of the construction now in progress.

The road will connect at the City of Panama with the proposed Inter-American Highway from the United States to South America. Between Texas and the canal, this highway now consists of about 727 miles of cart and foot trails, and 2,525 miles of roads that are either paved, all-weather, or dry weather. The last 164 miles to the canal are paved.

Except for about 25 miles of all-weather road below the city of Panama, the proposed continuation of the Pan-American Highway to Colombia is still impassable jungle.

Result of Treaty Agreement

The present plans for building the Trans-Isthmian Highway are the result of a treaty with Panama proclaimed in 1939. Under the terms of this treaty, the United States agreed to provide a corridor from the Panamanian city of Colon, formerly entirely surrounded by the Canal Zone, to the boundary of the Zone, and to construct a highway through this corridor.

The Republic of Panama, in return, agreed to provide a right-of-way to Alhajuela where the dam forming Madden Lake bridges the Chagres River and connects with the road from Alhajuela to Summit and the Pacific end of the canal.

The road will have two 10-foot lanes of reinforced concrete, of 9-inch uniform thickness, separated by a 4-foot bituminous strip. Eight-foot shoulders will be built on each side, making a roadway width of 40 feet.

The minimum radius of curvature is 573 feet, and the minimum sight distance is 600 feet. The maximum plus grade toward the Pacific will be 5 per cent. But toward the Atlantic the maximum plus grade will be 7 per cent for grades not more than 400 feet long, and 6 per cent for longer grades. The total excavation on the road is estimated to be a little more than 3,000,000 cubic yards.

Most of the excavation is expected to be of the common classification, although considerable ledge rock has been uncovered on the Madden Dam end, and more is expected in the deeper cuts. Some of the heavier cuts and fills approximate 100 feet in depth.

Exhaustive soil tests are being made by Public Roads Administration soils engineers assigned to the work. Their tests will reveal the composition and classification of materials, the maximum permissible heights of fills and the safe angle of slope for cuts and fills.

More drainage structures are required on this route than are needed on most roads of equal length in the United States, because of the heavier rainfall. The average annual rainfall in Panama is about 100 inches, most of which falls from May to December, the rainy season.

Six major bridges, six minor

• **Top: Shovel, bulldozer and trucks tackle a rock cut on the Trans - Isthmian Highway near Madden Dam. Center: An aggregate washing, screening, and loading plant at Rio Gatun receives its gravel from dredges that pump it through the pipe shown in foreground. Bottom: Tractor-drawn 4-wheel scrapers grade a 110-foot cut on the new route. The 700-foot cut contains 178,000 cubic yards.**

• Panama's heavy rains meant plenty of mud, here a 4-wheel scraper walks through some heavy going.

bridges, and numerous culverts are required. The largest bridge, that over the Rio Gatun, will be 330 feet long. Each of the major structures will have three spans, with continuous steel girders. The decks will be of reinforced concrete, with a roadway width of 26 feet between curbs. Railings will be of structural steel.

In designing the bridges it was desired to avoid any sort of portal structure and to select a type of structure that could be erected regardless of weather conditions. These requirements were met by a deck structure that could be erected without falsework.

The American Association of State Highway Officials standards are used throughout in the design of bridges and culverts. Structures designed for these standards are capable of safely carrying 55-ton tanks.

The location survey was started from three points in October 1940 and was completed last April. Construction of concrete box culverts is being carried on directly in advance of excavation work, and clearing and grubbing work is proceeding from various points on the projected line.

Modern Grading Operations

At the present time grading operations are in progress out from Madden Dam, from Rio Lopez southeastward to Rio Gatun, and in both directions from Rio Gatun near the site of the bridge crossing.

The thousand men employed on the engineering and construction of the highway are housed in camps located at Sabanita, Rio Gatun, and Madden Dam. Electric lights have been installed so that some of the work is on a 24-hour basis, six days a week. Twenty-seven 12-yard tractor-scraper units, three 1½-yard power shovels, and two ¾-yard draglines are in use. In addition to the tractor-scraper units, 15 bulldozers are used for pioneer road construction and opening large cuts. A portion of the excavation is of such a nature that movement of earth by bulldozers is very economical.

All clearing and grubbing is done by native machete men and four treedozers assist in removing from the right-of-way large trees that have been felled by the machete men.

Two eight-inch sand and gravel pumps mounted on barges are at work in Rio Gatun approximately one mile from where the route crosses the river.

Sand and gravel is pumped 600 feet to a plant where it is loaded into six-yard trucks which haul the aggregates over a pioneer road to the batching plant at the crossing of the Rio Gatun.

Most of the heavy duty equipment — shovels, tractors, and scrapers—were unloaded at Monte Lirio on the Panama Railroad and carried by barge 11 miles to the point where the highway crosses the Gatun River. At other points where camps were established, pioneer roads were constructed and equipment, supplies, and materials were sledded in using tractors.

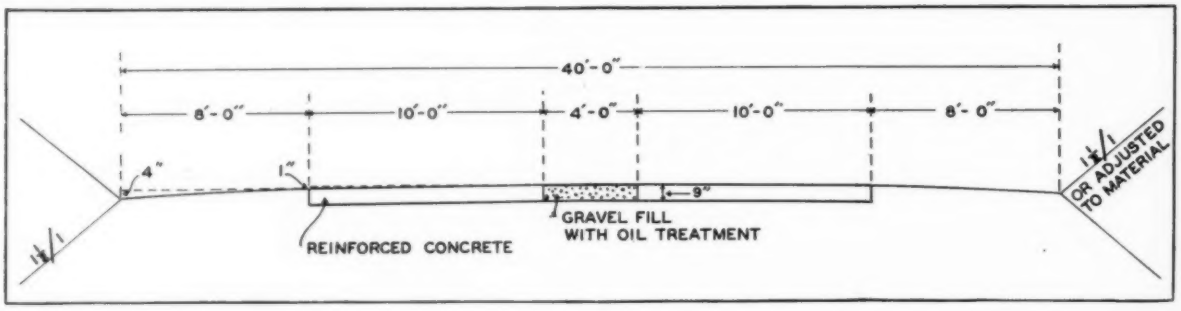
Panamanian labor is used extensively for the unskilled labor in clearing and grubbing and other construction operations. Panamanian instrument men, chainmen, rodmen, and machete men are employed with the engineering parties.

Operators for the heavy power equipment have been brought from the United States because of the need for men skilled in the use of these types of equipment. Panamanian laborers are given every opportunity for employment in all positions for which they may be qualified.

Cement will be shipped in a chartered bottom in order to assure a constant supply. It will be brought to work through Summit and Monte Lirio by truck and barge, respectively. Cement and structural and reinforcing steel will be shipped from the United States. Construction of reinforced concrete pavement will begin in the near future.

All engineering and construction work is being carried on by the Public Roads Administration.

• A Public Roads Administration tentative cross section sketch of the divided two-lane Trans-Isthmian Highway.



THE POWER FOR *big* PRODUCTION

Whatever the size of your equipment, you've a lot of advantages for better-than-normal production — and *profit* — when there's a "Caterpillar" Diesel Engine on the power end.

First, you have a precision-built Diesel fuel system, of exclusive "Caterpillar" design, which gives you better-than-ordinary fuel economy — through its ability to burn such extra-cheap fuel as No. 3 domestic burner oil and to burn it with outstanding efficiency. This system requires no mechanical adjustments. It burns fuel cleanly and completely at all loads and speeds. Exclusive absorbent-type fuel filters protect it against harmful dirt and grit.

Secondly, you've a power-plant that's built for the toughest going; for long stretches of running; for a long serviceable life. Quality materials and durable construction are put into every part and assembly. "Hi-Electro" hardening, for instance, gives crankshaft journals and cylinder liners far greater wear-resistance than is possible with any other practical method of heat-treatment. All vital parts are sealed against dirt and grit. Dual cooling (via both oil and water) keeps this engine at uniform, efficient operating temperature for the maximum power and steady performance which mean BIG production no matter what the job.

Thirdly, you have the world's finest engine replacement parts and mechanical service standing by to make doubly sure you get top production from your "Caterpillar" Diesel-powered machines.

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225 yards of material per hour fall from the 1½-yard bucket of this Bucyrus-Erie shovel powered with a rugged "Caterpillar" Diesel D13000 Engine. Working 10 hours a day for the New Mexico State Highway Department, the outfit consumes only about 24 cents' worth of fuel per hour. BIG production at little power cost!

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Equipment you ought to KNOW ABOUT

Concrete handling equipment

Manufacturer: Garlinghouse Bros., 2416 East 16th Street, Los Angeles, California.

Claims: Double gate, low head room hopper for high-dump truck mixers. Has four wheels, a new development which permits easy transport, and allows the hopper to be moved from job to job without jacking or the use of blocks. Specially low built. Designed to

accommodate the mix from a four cubic yard high-dump truck mixer. A side section is easily removed to accommodate the dumping of a three cubic yard mixer. The all-welded steel bin is built bathtub-shape to insure self-cleaning. Double clamshell gates have a floor clearance of 36 inches for loading concrete carts. Gates are 10 inches by 15 inches unless otherwise specified. Center discharge eliminates segregation. Overall dimensions, 8 feet wide by 13 feet long by 6 feet 3 inches high. Total weight 3,000 pounds.

Power grader

Manufacturer: The Austin-Western Road Machinery Co., Aurora, Illinois.

Claims: All wheels are equipped with large diameter tires, equal in

size for convenient interchangeability, and all wheels are driven and steered by power. Can grade

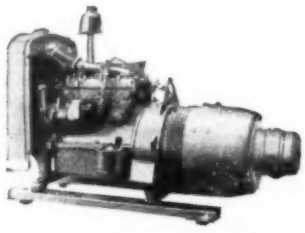
For further details about the equipment on this page please write to the manufacturer, mentioning Excavating Engineer.

steeper bank and ditch slopes, with a longer blade; and it can offset the frame to distribute power along the entire moldboard to move heavier loads. Increased maneuverability and a short turning radius. Adjustments are all made by hydraulic power control from the cab, including shifting the blade on its arms; reversing circles; steering front and rear wheels, and raising and lowering blade. When attachments are used, hydraulic power operates scarifier, loader, roller, bulldozer, snow plow and snow wing. Can be furnished with either diesel or gasoline power.

Katolight A. C. plants

Manufacturer: Kato Engineering Co., 530 N. Front St., Mankato, Minn.

Claims: Three new low speed 1200 r.p.m. models. The new sizes



are 5,000, 7,500 and 10,000 watts. Available with either two or three wire service or three phase, at 60-cycles. Generators are of the revolving armature type, generator frame being mounted directly to engine bell housing. Plants are furnished both with separate exciter attached to outer generator end-bell and also with exciter winding carried on main A. C. armature. Armature laminations are 26 Ga. silicon steel, pole pieces are of laminated construction. Ball bearings are of greased sealed type; ball bearings of the cartridge type. Complete engine and generator assembly is mounted on rubber, permitting installation of plant without bolting down on foundation. Plant used for portable truck or moving vehicles can be anchored without restricting action of rubber mountings. The 5,000 watt size can be furnished with full automatic control, larger size available only with remote control. Unit is powered with a LeRoi 18.5 h.p., four cylinder, four cycle, watercooled engine. Voltage regulation is, in most cases, from 6% to 8%. Generators are filtered and ignition system shielded for radio operation.

Earthmoving tire

Manufacturer: The B. F. Goodrich Co., Akron, Ohio.

Claims: For service in the construction of airports, military reservations, dams, highways and other large earthmoving projects. Called the Universal Super Traction tire. Is a non-directional tread designed to give two-way traction, forward or backward, and a minimum of side-slippage in service on the sides of hills or ditches. The new tread, composed of a series of V-shaped wedges that are self-cleaning will not clog in soft or muddy going. Makes the tire especially suited for use on logging trucks in lumber camps where off-the-road traction, and slow even tread wear for movement over highways, are required. An unusually heavy thickness of rubber on the sidewalls to protect the tire against chafing and cutting in operations in mines, quarries and other services around rocks and stones. An

important advantage in the use of pneumatic tires is the fact that heavy earthmoving vehicles can be moved over highways without damage to the road surface.

14 TIMES 'ROUND THE WORLD

— without "truing-up" a single crankshaft

That's saying perfect performance —no engine failures—no needless layups—plenty strong! And here is the whole story from Mr. D. E. Moffett, of Ogden and Moffett, Port Huron, Michigan.

"During the past two years," he relates, "we have added eight Model HB 150-horsepower Cummins Diesel motors to our fleet. *Some of these engines have traveled as much as 350,000 miles without as much as turning a crankshaft down.*

"We believe that RPM DELO has played a large part in running up this mileage" (equal to 14 times around the world). "It has kept our rings from sticking and crankcases cleaner for a longer period than any other oils tested . . . Consumption has been almost negligible. We believe RPM DELO is *the* oil for Cummins Diesels."

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DIESEL ENGINE LUBRICATING OIL

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FOR YOUR DIESELS

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Ask your Diesel engine manufacturer or distributor for the RPM DELO supplier in your locality.

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Shots from the FIRING LINE

Santa Fe Dam Underway

By John R. Marcy

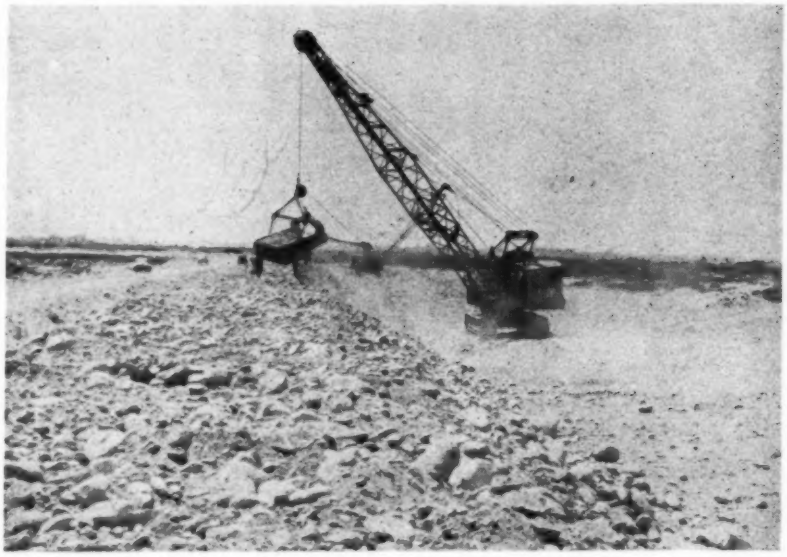
The Santa Fe Dam contract was awarded in July on a low bid of $8,837,-199 to a combination of firms consisting of Morrison-Knudsen Company, Inc., of Boise, Idaho; Winston Brothers Company; J. F. Shea Company, Inc.; and F. J. Twaits Company; all of Los Angeles.

The dam is located about 29 miles above the mouth of the San Gabriel River near Azusa, California, and will be the third structure to span the stream, the other two being located farther up in the mountains.

It will be a rolled earthfill type designed to retard and not impound the water. Semicircular in shape, the embankment will be 24,000 feet long and 92 feet high, with outlet works in the embankment, spillway at the right wing, and discharge channels for the spillway and outlet works. Levees 5,000 feet long and 12 feet high will be constructed downstream from the spillway and a desilting basin will be located just in front of the dam to remove debris and retard water flow. The outlet capacity will be 37,000 second feet, and that of the spillway 200,000 second feet.

About 12,000,000 cubic yards of material will go into the embankment, which will be constructed in five zones determined by the kind and size of material and method of placing. The work, which is under the supervision of the U. S. Engineers, must be finished within 830 calendar days.

Field offices have been established at the site, construction of a large shop is in progress, and equipment is being moved in. The San Gabriel River at this point has spread widely over the plain, depositing a mass of gravel and "niggerhead" boulders that is said to be as much as 500 feet deep. Small brush covers most of the site, and this is being cleared by hand labor, while stripping operations with bulldozers is also going forward.



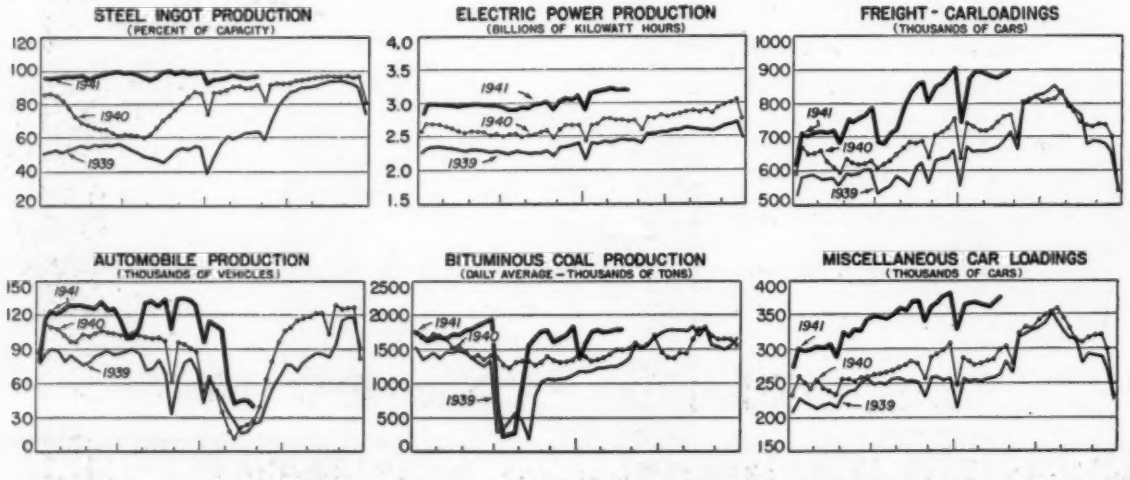
•Working amid heavy gravel and "niggerheads," a Northwest dragline throws up a temporary diversion levee on the Santa Fe Dam site.

Chief work to date consists of throwing up a temporary diversion levee about 1½ miles long, 12 feet wide at the crest, 28 feet at the base, and averaging 8 feet in height. This is almost completed, three draglines doing the bulk of the work, one to throw up the material, another to rough grade, and the third to final grade. While the material is not hard to handle, its abrasive quality presents a problem in equipment wear which will be present during the whole course of construction.

Since there is no clay near the site, borrow pits for the core material will be located several miles away in the hills. Large capacity Euclids will bring it in over their own specially constructed underpass road.

Specification estimates call for:

MONTHLY BUSINESS INDICATORS



Steel Conserved by Preformed Wire Rope would build 2,095 Anti-Aircraft Guns

★ Each year American industry uses more preformed wire rope because it saves money by lasting longer, and saves time through fewer machine shutdowns for replacements. Operating men like it because it steadies production and increases safety.

★ Now all of a sudden, for another reason, preformed is tremendously important—because wire rope that lasts longer *conserves steel which America greatly needs.*

★ For example, the steel conserved this year by the longer service of preformed wire rope will be enough to build 2,095 anti-aircraft guns.

★ Buying and using preformed wire rope is patriotism industrialized.

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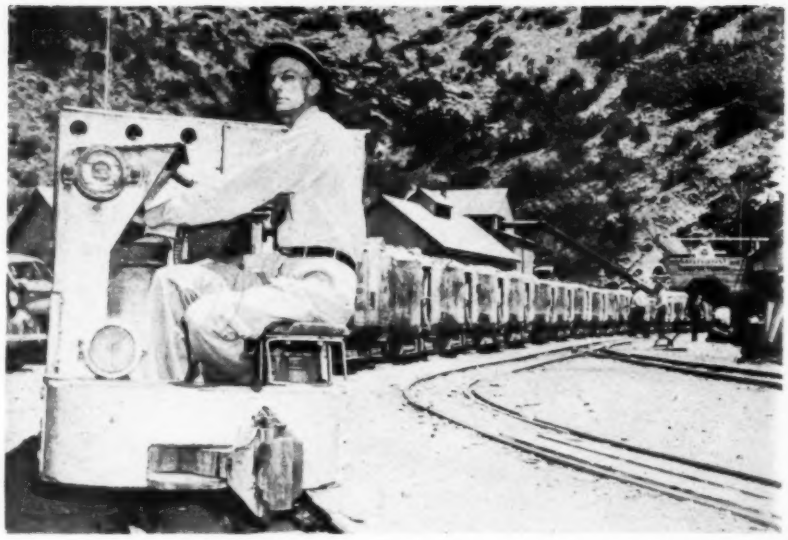
640,000 cu. yds. of stripping
1,130,000 cu. yds. of common excavation
31,000 cu. yds. of structure excavation
11,000,000 cu. yds. of excavation, pit B
1,400,000 cu. yds. of excavation, pit A
154,000 cu. yds. of backfill
1,000,000 cu. yds. of embankm't, zone 1
640,000 cu. yds. of embankm't, zone 2
7,260,000 cu. yds. of embankm't, zone 3
620,000 cu. yds. of embankm't, zone 4
2,430,000 cu. yds. of embankm't, zone 5
210,000 cu. yds. of fill, levees and spillway
92,000 cu. yds. of quarry run rock, levee blanket and toes
52,000 cu. yds. of derrick stone, aprons
1,250 squares of grouted rock paving
70,000 yards of concrete, slabs, footings, and cutoffs
42,000 yards of concrete for spillway
50,000 yards of concrete for intake, control works, etc.
11,500,000 lbs. reinforcing steel
463,000 lbs. structural steel

A. H. Johnson is general superintendent in charge of the work for the contractors, Oscar Erickson is in charge of concrete operations, and R. F. Rasey is project manager.

Carlton Tunnel Completed

Superintendent John R. Austin took over the controls when the last muck train made its way out of the newly completed six-mile Carlton Drainage Tunnel, at Cripple Creek, Colorado. This 20-car load was the 5,798 such train to be brought out by three General Electric storage-battery locomotives during the 567 working days of the project.



• Superintendent John R. Austin at the controls of the last muck train on its way out of the newly completed six-mile Carlton Drainage Tunnel at Cripple Creek, Colo.

Begun on July 18, 1939, and expected to require four years for completion, the deep drainage tunnel was driven at record-breaking speed, and officially finished two years and a week later. It was driven at an average rate of 51.09 feet per day. Over 1,000 pounds of powder were used in the excavation, and the trains hauled out 53,219 carloads of hard, Pike's Peak granite.

The tunnel, driven to unwater the mines of the Cripple Creek gold-mining district, has already proven highly

Easier operation and greater spread with Williams double hinge arrangement.
"WE FIND THE DOUBLE HINGE A DECIDED ADVANTAGE IN HARD DIGGING AND WET EXCAVATION."
Eugene F. Verga, Inc., New Jersey Contractors, writes:
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Strip 50 Feet of Rocky Overburden

FROM OHIO COAL PIT

Using only center tooth for maximum penetration, R. L. Griggs' Rooter breaks up rocky overburden for low-cost 'Dozer and Carryall Scraper excavation.

4 YEARS' experience with LeTourneau equipment on some of Ohio's toughest coal stripping jobs convinced R. L. Griggs that he needn't hesitate to tackle 60,000 yards of rocky overburden, near Hopedale, Ohio, with his veteran LeTourneau fleet.

Rooter Cuts Blasting Costs

LeTourneau Angledozer and Heavy-Duty Rooter, worked in combination on a "Caterpillar" D8 tractor, are kept in constant use. The 'Dozer handles short haul stripping; the Rooter breaks rocky formations for easy 'Dozer and Carryall Scraper excavation. A minimum of blasting is required, and then only in solid rock, where Rooter can't get a "toe hold."

On the longer hauls, two 16 heaped yards LeTourneau Carryalls with "Caterpillar" D8's load and haul the broken rock from the pit, waste it to one side.

Currently these rock-handling tools have stripped a box cut 50 feet deep, 70 feet wide and 280 feet long; next, will strip the last few inches off the coal vein, without necessity for bringing in special clean-up tools.

"Best on the Market"

On another section, job superintendent Russell F. Mencer, reports these two Carryalls, Rooter and 'Dozer, working over 1200-foot round trips, stripped 120,000 yards in two months. He adds, "After 4 years of supervising and operating LeTourneau equipment on extra tough coal stripping jobs, I heartily believe it's the best on the market today."

Try this short cut to lower coal costs on your own property. See your LeTourneau-"Caterpillar" dealer about this modern LeTourneau stripping method TODAY!

CARRYALL* SCRAPERS, ANGLEDOZERS*, BULLDOZERS, ROOTERS*, POWER CONTROL UNITS, TRACTOR CRANES, PUSH-DOZERS, SHEEP'S FOOT ROLLERS, TOURNAPULLS*, TOURNATRAILERS*, TOURACRANE.

* Name Reg. U. S. Pat. Off.

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successful. Some of the mines already are free from water, and others are rapidly draining. Unwatering started February 19, 1941, when the New Market fault was encountered, and water ran from the portal of the tunnel at a rate of 20,000 gallons per minute; the flow is now 7,500 gallons per minute. Small crews will drift from the main bore, following faults and fissures in an attempt to speed the water flow. It is estimated that the present rate of flow is sufficient to drain the entire Cripple Creek district.

Lompoc Cantonment Started

By Floyd Suter Bixby

In the flat coastal area between Lompoc and Santa Maria, California, one of the largest army camps of those to be built under the national defense program will soon be under way, according to the Zone Constructing Quartermaster of San Francisco. The Lompoc project is one of the largest of many permanent camps costing between 25,000,000 and $30,000,000 each, to be scattered throughout the nation.

One full armored division, consisting of 757 officers, 15,500 enlisted men, and 3,390 pieces of equipment ranging from motorcycles to 30-ton tanks, will be quartered in the new camp, and there is a possibility that the cantonment will be enlarged later to accommodate two such divisions.

Only five months from September 10 will be allowed for the completion of the giant project, which involves such items as the construction of 1,685 buildings, a 1,500 bed hospital, two 4,000,000 gallon storage reservoirs, and 1½ million cubic yards of excavation in the access highways, camp roads and the railroad spur.

About $2,000,000 is now available to begin construction, and it is expected that a later congressional appropriation will provide additional funds to complete about $17,500,000 worth of construction called for under present plans and specifications.

Preliminary work alone, necessary in connection with preparing the plans and specifications, was a gigantic task. Initial surveys included triangulation and aerial photography on 100,00 acres, topographic 10-foot contour mapping of 45,000 acres, and topographic 2-foot contour mapping of 800 acres in the camp site on Burton Mesa. In the record time of 90 days the engineering firm of Leeds, Hill, Barnard and Jewett of Santa Maria rushed out all the work connected with the plans and specifications. The auditorium of the Santa Maria Legion Memorial Building, accommodating 125 draftsmen, was used to make all the necessary tracings.

Bids, which are being opened as this issue of Excavating Engineer goes to press, have shown the firm of MacDonald and Kahn of San Francisco, and the J. F. Shea Company of San Diego to be low in their joint estimate. The bidding was exceptionally close between the MacDonald firm and the Morrison-Knudsen Company, who made the second low bid. It is expected that the work will get under way immediately.

Maryland's Highway Plans

Forecasting a tremendous improvement in Maryland's road system, Gov-

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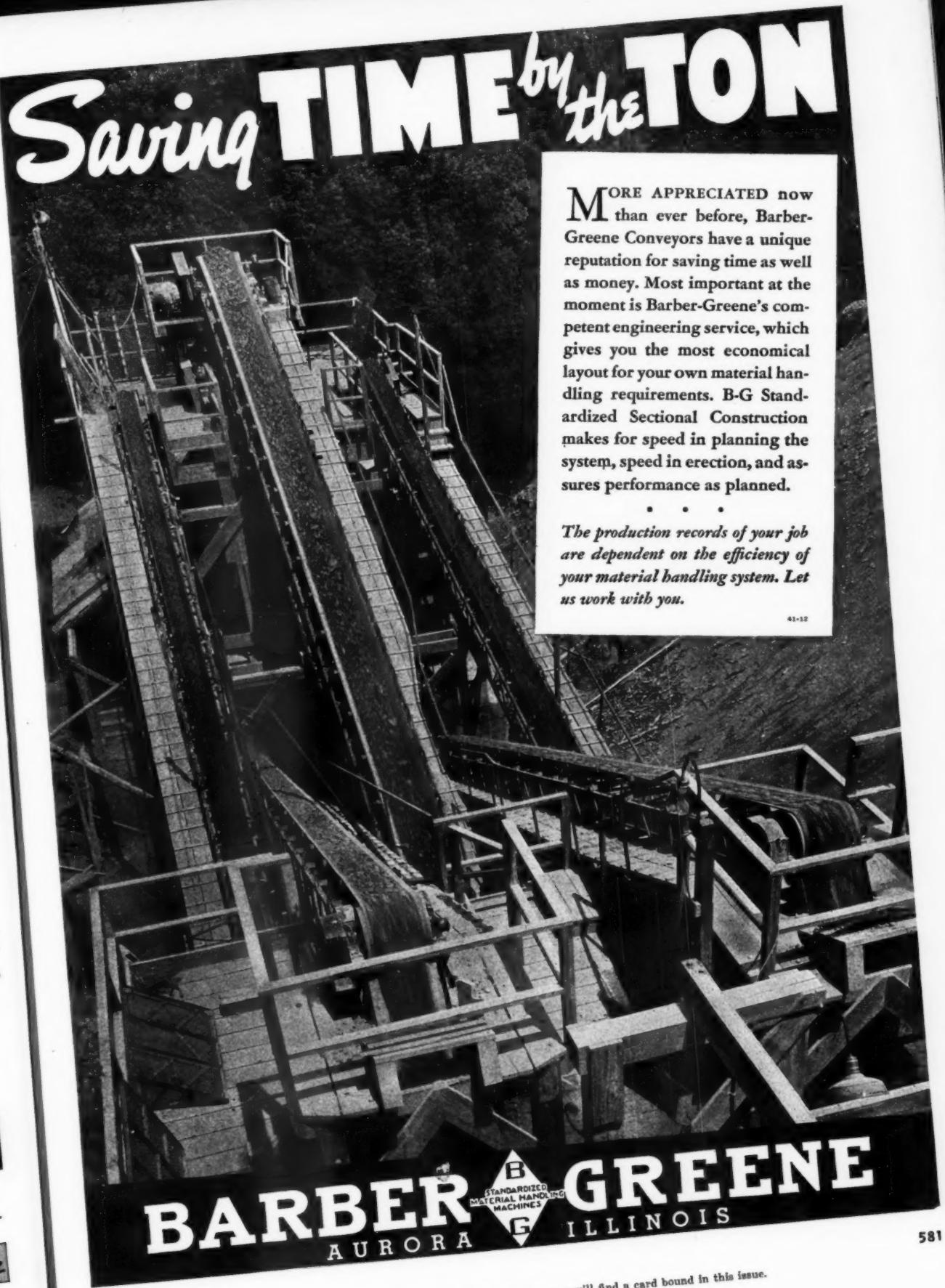

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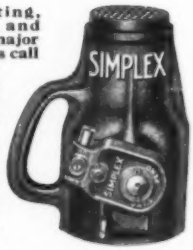
For your convenience in writing to Barber Greene, you will find a card bound in this issue.

An average man with a 50-ton Simplex Journal Jack can lift more than 690 times his own weight!



The really big lifting, lowering, moving and supporting jobs on major construction projects call for the use of Simplex Journal Jacks—4 sizes, 15, 25, 35 and 50-ton capacities. They are tougher than tough, provide maximum stability and safety. Lift loads nearly half a foot at one setting. Safety stop prevents over-extension.
Speed today's vital projects by equipping construction crews with these time and labor-saving tools. These, as well as Simplex Automatic Raising and Lowering Jacks, Screw Jacks, Hydraulic Jacks and other cost-cutting construction jacks, are shown in Catalog 41 — get your copy.

Templeton, Kenly & Co., Chicago, Ill.

Better, Safer Construction Jacks Since 1899

Simplex Jacks
dependable and efficient
Lever Type for toe and cap lifting.
Hydraulic for easier cap lifting.
Screw Jacks for economy.

David D. Coleman

David D. Coleman's many friends and business associates throughout the South were saddened by news of his death at Columbia Hospital, Milwaukee, Wisconsin on July 31, 1941 at the age of 48. Mr. Coleman was a partner in the firm of Horton-Coleman Company, levee contractors with headquarters in Memphis, Tennessee.

A resident of Memphis, Mr. Coleman had gone to Milwaukee for special hospital treatment after a sudden illness. The husband of Alma Sell Coleman and father of David D., Jr., Mr. Coleman was also survived by three sisters, Mrs. Elizabeth Hepp, Mrs. Jane Carlson of Winamac, Indiana, Mrs. Bertha House of Royal Center, Indiana and two brothers Harvey and Charley Coleman also of Royal Center.

Interment was in Memorial Park Cemetery at Memphis.

Sept. 7 that $5,300,000 in construction contracts had been awarded in the preceding four months and that bids for $672,000 in additional highway work were being awaited.

The work in progress and that contemplated in the immediate future, the governor noted, is the "largest amount of road work ever undertaken in the state during a similar period."

"The $6,000,000 represented in the enumerated operations," he stated, "include important road projects in connection with defense plants and in various parts of the state.

"Among the largest of the projects included in the four-months' sumary are the road improvements near the Glenn L. Martin plant totaling $496,628; construction work on Edmondson Avenue extension for which contracts totaling $564,000 have been awarded, and the approaching roads to the Ocean City bridge to cost $453,000.

"One of the most satisfactory features of the summary is the indication that so many sections of the state are represented.

"In all, 32 projects are included in the $5,300,000 of state spending, while $439,000 has been contracted for in 11 county projects, the most important of which is on the Old Power Factory road, in Prince George's county, where the contract totals $136,000.

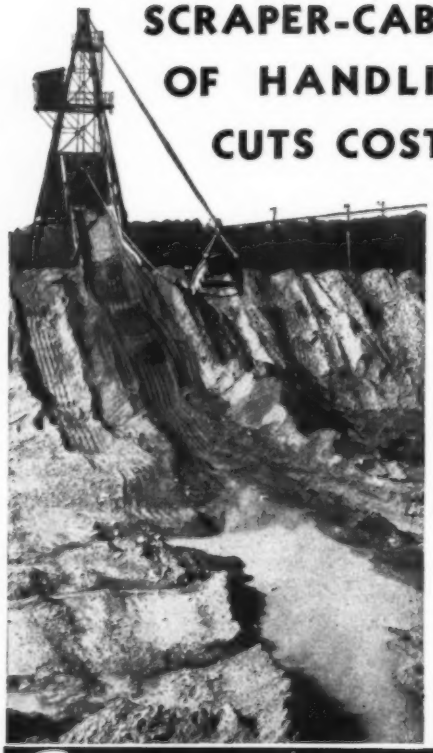
"While the report shows a most satisfactory speedup of functioning by the State Roads Commission, it is at the same time a reminder of the great amount of work facing the administration in all sections of the state as a result of the letdown in construction and improvements during the years immediately preceding this administration.

"With the State Roads Commission now working at full speed, I have every hope that the coming 18 months will witness tremendous improvement in the Maryland system of roads, in addition to what already has been accomplished, to the point where we again will compare favorably in respect with the other states in the Union."

Highway Construction Priorities

Priority assistance in the acquisition of materials for six classes of highway construction, when and if shortages

SCRAPER-CABLEWAY METHOD OF HANDLING MATERIALS CUTS COSTS TO THE BONE



ON WORK where materials have to be moved 100 to 1000 ft. or more, a Sauerman machine cuts costs by being able to dig, haul and place the material in a continuous, straight-line operation, doing away with the expense of rehandling. One man controls the entire operation.

The complete line of Sauerman scraper and cableway machines includes sizes to meet all capacity requirements. There are light, portable units for small yardage jobs and there are great powerful machines that take a 15 cu. yd. load of material at a single bite and haul this big load across the ground at a speed of 300 feet per minute.

GET THIS USEFUL BOOKLET

Typical examples of pit and bank excavation, alluvial mining, moving blasted ore, deep dredging, stock-piling and reclaiming, etc., are illustrated in the Sauerman catalog. A copy of this booklet is yours for the asking.

SAUERMAN BROS., Inc.
474 S. Clinton St. CHICAGO

Sauerman LONG RANGE MACHINES

For your convenience in writing to the advertisers on this page, you will find a card bound in this issue.

AIRPORTS START WITH EXCAVATION

★ ★ ★ Joseph Kesl's Bucyrus-Erie 37-B here clams out clay in constructing Lambert Airport in St. Louis. Airport construction like ALMOST EVERY kind of defense work, is basically dependent on excavating. You'll find Bucyrus-Eries on these defense projects all over the country because they have the speed, power and endurance necessary to efficient handling of rush work. Plan now to take advantage of the Bucyrus-Erie performance on your own jobs. Bucyrus-Erie Company, South Milwaukee, Wisconsin. ★ ★ ★

BUCYRUS ERIE V-12

EXCAVATING, DRILLING AND MATERIAL HANDLING EQUIPMENT

THE GROUNDWORK OF DEFENSE

For your convenience in writing to Bucyrus-Erie Co., you will find a card bound in this issue.

occur, is assured in a "letter of intent" made public Sept. 3 from the Office of Production Management to the Public Roads Administration.

The letter made clear that the Priorities Division stands ready to facilitate the acquisition of material and supplies for the development of a strategic network of highways approved by the U. S. War Department in conformity with a master plan.

By distributing copies of the letter to prospective contractors and suppliers at the time of letting contracts, the Public Roads Administration and the state highway departments will indicate the preference ratings available for the types of construction to be expedited.

Application for priority assistance to obtain deliveries of materials, supplies and equipment on schedule should be made by the state highway department concerned through the Public Roads Administration to the Project Section, Division of Priorities, Office of Production Management. If circumstances warrant, a preference rating order will be issued assigning appropriate ratings to deliveries of materials.

The six classes of preference roads and ratings to be granted, as listed in the letter, appear below:

1. Access Roads:
   a. Access roads to military and naval establishments — preference rating of the access road project shall correspond to the rating of the military and naval establishments served.
   b. Access roads to defense manufacturing establishments — preference rating of the access road project shall correspond to the rating of the defense establishment served, except that the highest rating which can be assigned is A-1-e.

Preference Rating

2. Strategic Network of Highways:
   a. All bridges, tunnels, structures and approaches A-2
   b. New roads or the improvement of substandard roads and grade separation structures A-4
   c. Shoulder widening and minor drainage structures A-10
   d. All other work B-3
3. Federal-aid System:
   a. All bridges, tunnels, structures and approaches A-3
   b. New roads or the improvement of substandard roads and grade separation structures A-7
   c. Shoulder widening and minor drainage structures A-10
   d. All other work B-3
4. Federal-aid Secondary and National Park & Forest Projects:
   a. Bridges and approaches A-7
   b. New roads or the improvement of substandard roads and grade separation structures A-10
   c. All other work B-3
5. Projects for the construction or improvement of the Inter-American Highway in Mexico and Central America A-3
6. Construction of the Trans-Isthmian Highway and the Chorrera-Rio Hato Highway in Panama A-1-b

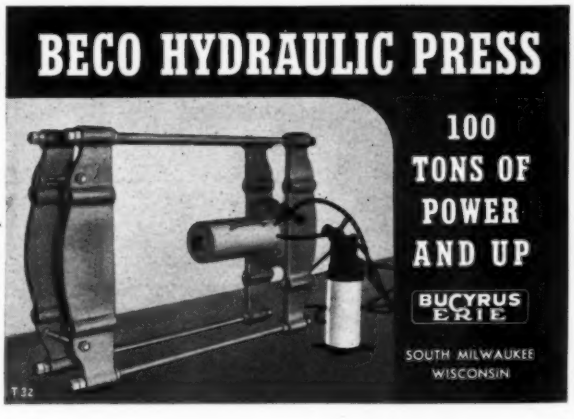
Sandy Hook Harbor Project Nears Completion

Rapid progress of dredging operations on the $1,025,000 Sandy Hook harbor project at Atlantic Highlands, New Jersey, was cited recently by Earle S. Snyder, chairman of the Harbor Commission, as basis for expectation that the project would be completed within two and a half months instead of within the four-month period specified by the United States Army Engineers Corps.

Hill Dredging Company of Atlantic City is dredging 500,000 cubic yards of the waterway to an even level of 10 feet at low tide in order to provide anchorage and docking facilities for shallow-draught boats.

Snyder said that work on extensive inshore improvements, including a public park, administration building, six T-shaped piers and parking facilities, is expected to begin early in January, with the prospect of completion by next summer.

HAYWARD
GOOD FOR
YEARS OF HARD SERVICE
A HAYWARD Bucket is an investment, not a gamble. It helps you make a profit on every job.
THE HAYWARD COMPANY
52-54 Church Street
New York, N. Y.
BUCKETS



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ONE OF OIL'S TOUGHEST JOBS is keeping your air drills at top efficiency. Here's how Gargoyle Voco Engine Oil No. 1 does it:

This fine oil seals the piston against power-wasting "blow-by." It minimizes costly cylinder wear with a tough lubricating film . . . functions at low temperatures to prevent valve sticking.

But, above all, Voco Engine Oil No. 1 doesn't wash off! It sticks tight—even under constant washing by moisture entering with the air.

That kind of protection means less worry and expense for you.

GARGOYLE

Lubricants

The Emblem of 75 YEARS' PIONEERING in "Correct Lubrication" 1866-1941

"Correct Lubrication"

E RIGHT OIL FOR EACH JOB • NEW BRICANTS AHEAD OF NEW NEEDS •

SOCONY-VACUUM OIL COMPANY, INC. • Standard Oil of New York Div. • White Star Div. • Lubrite Div. • Chicago Div. • White Eagle Div. • Wadhams Div. • Southeastern Div. (Baltimore) • Magnolia Petroleum Co. • General Petroleum Corp. of Calif.

For your convenience in writing to Socony-Vacuum Oil Co., you will find a card bound in this issue.

Mesabi Mine

(Continued from page 567)

the mill to 45 feet at the far end, with track space enough for 60 empty cars.

Mining of the ore began on April 28, the day after the plant was completed. Ore moving equipment consists of the new Bucyrus-Erie 37-B shovel and the seven Ford trucks used on the stripping. Five trucks are normally required to keep the plant in ore. The two extra trucks are used on the stripping or are kept as spares. The first cuts in ore were made without blasting, though as the pit was deepened and extended eastward, rock seams were encountered in the ore which made blasting necessary. The churn drill previously used for exploration work was brought into pit service drilling blast holes. Six-inch regular Bucyrus-Erie Type G bits are used on a 28-foot drill stem. Ordinarily, only one row of holes is drilled on a bench, 15 feet back from the working face, and 15 to 20 feet apart. Holes are bottomed five feet below the toe of the bank being drilled in order to insure full breakage between the holes at the bottom of the cut. Footage drilled per eight hour shift runs from 80 to 120 feet, depending on the character of the ore formation drilled and the depth of the holes. The blast holes are not sprung, but are bottom loaded with 5″x16″ sticks of Hercules 25% gelatin and fired electrically in groups of from 3 to 10 holes. A four hole shot, using 1000 pounds of powder in a 45 foot bank, on which record was kept showed a ratio of around 14 tons of crude ore per pound of powder.

As pit operations developed higher banks, a Parmanco Horizontal drill was put into pit service, and has since drilled most of the blast holes in ore. This machine is a newcomer on the range, but has already proved its worth. With it, 6″ horizontal holes spaced 20 to 25 feet apart are drilled along the toe of the bank to be shot. Depth of the holes varies from 20 to 40 feet, depending on the height of the bank and the width of break desired. Horizontal holes are loaded with 5″x20″ sticks of Hercomite No. 4. As holes are drilled dry and no water is encountered in the formation, it is possible to use this type of powder. For stemming, the drill cuttings are shoveled into paper bags, which are tamped tightly with a long loading stick. Two men are able to make 100 to 130 feet of holes drilled, loaded and shot in eight hours with this machine in average ground. In blasting the ore banks, the desired effect is that of only shaking up and loosening the formation. Where bank height is not greater than the maximum height the shovel can reach it is not necessary to knock the bank down.

Both drilling machines give very satisfactory service within their limitations. In soft to medium hard ore formation, the Parmanco machine far outdrills the churn drill in footage per shift. The horizontal holes also give better powder distribution, thus reducing drilling and blasting costs and increasing tonnage broken per shot. The churn drill, however, has proved itself indispensable in drilling for sinking cuts, and in rocky banks where the Parmanco cannot make any headway at all.

Developing the Pit

Ore banks are kept under 30 feet in height as this is the maximum height the 37-B can reach. To attempt mining higher banks than this would require harder blasting to prevent dangerous overhangs. Rock in the ore too large to be sent to the plant is sorted out and cast behind the shovel against the toe. It is loaded out on the third shift, when the plant shuts down. Very few taconite chunks are encountered that require breaking before loading, but if necessary, this is done by mud capping.

As the pit was developed to the south, the paint rock layer was encountered. This was blasted, using both drills, and stripped off to expose the underlying ore. Paint rock is kept separate from the overburden on the dumps, in the hope that some day it may be found usable.

The pit layout is so arranged that the 37-B and 34-B shovels can move rapidly from one bank to another as ore grade requirements are changed. The bulldozer is used in the pit at both shovels to clean up spill at the loading spot, level off behind the shovels, and maintain roads. Road grades in the pit and on the dump are kept under 10% wherever possible. The main haulage roads are cut to a 7% grade. Road maintenance is handled by use of a grader and bulldozer. Calcium chloride is spread on the ore haul road to keep down the dust. On ore, roads are no problem, as the formation is solid and roads require only occasional blading. On the overburden, however, roads become more of a problem. Careful attention was paid at the start of the operation to the proper construction of haulage roads. They were first cut well below grade, ditched for thorough drainage, then filled with gravel and topped with lean ore. The lean ore topping

• Where possible, this Caterpillar-towed 12-yard LeTourneau handled its share of the drainage ditch excavation job.

Three International TD-18 Diesel TracTracTors, with scrapers, grading runways on the Henderson, Fla., airport. This equipment is owned by Simpson Construction Co., McClenny, Fla.

Airports Now!

with INTERNATIONAL TracTracTors Doing the "Spade Work"

AIRPORTS are multiplying over America. Almost overnight, new ground is cleared and leveled, runways appear, the field is ready.

The call for "Airports NOW!" finds International TracTracTors in there working where the going's tough! Contractors hand it to these sturdy crawlers because they *do the job fast* and *do it at low cost*. These men know that when you put the right sized bulldozers, bullgraders, rollers, rippers, graders and scrapers on these TracTracTors, they've got a combination that steps out ahead of the field.

Before you begin your next airport assignment, find out how International TracTracTors will fit the job. There is a wide choice of sizes, in both gasoline and Diesel models. All these crawlers have Tocco-hardening — which Harvester pioneered — in crankshafts and track pins. And here's something important to remember about *fuel economy:* Official tests show that *size for size* and *type for type*, International TracTracTors use less fuel than any other crawler tractors in the same power range.

INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue Chicago, Illinois

INTERNATIONAL Industrial Power

• The 2,000-foot ditch to by-pass swamp drainage also called for the services of this ½-yard Speeder dragline.

packs well and hardens, becoming practically impervious to water. This care has shown results in uninterrupted ore movement during the heaviest rains.

At present, the ore is developed on three benches, with the bottom cut down on the water table. No water has been encountered in the ore down to the present bottom, and as enough ore is available for this year's needs above the ground water level, the pit will not be further deepened. A sump has been cut to take care of rain water that may enter the pit, and the bottom wherever possible is graded so as to drain toward the sump. Due to heavy rains earlier this season, it was necessary several times to do some pumping. The first pump used was an Ingersoll-Rand 250 gallon per minute sinker pump, hung on a beam over the tail gate of a truck. Water was pumped out over the bank through a 3" fire hose. Because this pump required a 440 volt power line and switch in the pit, a Rex 20-M speed prime pump with a Wisconsin gas engine drive was substituted for it. This is hauled around in a truck and it is a very simple matter to back up to the sump, drop the suction over the side and run the hose line out over the bank. When pumping is completed, the hose is coiled in the truck and the whole unit removed from the pit. This method eliminates a pump station and pipe lines in the pit and has the added advantage of being a mobile unit that can be used anywhere on the job.

Due to the aforementioned heavy rainfall, the tailings pond which drains a large swamp area overflowed, running a considerable amount of red water into a nearby stream. To prevent a recurrence of this, a ditch about 2000 feet long was dug to by-pass the swamp drainage. Where possible, this was done with a LeTourneau 12-yard scraper pulled by a D-8 Caterpillar tractor, working with the bulldozer. About half the ditch was dug through soft ground with a ½-yard Speeder dragline hired for the job.

Second Deposit Discovered

Preliminary exploration drilling disclosed a small pocket of ore about 300 feet north of the original pit. The two ore bodies are separated by an area of taconite. The upper 5 to 10 feet of stripping on pit No. 2 was removed by the scraper unit and bulldozer, but a heavy layer of boulders finally made scraper work impractical and the 34-B was moved onto the job. An approach was cut through on the top of the formation to pit No. 1 and the ore hauled into pit No. 1, along the berm at the toe of the stripping and up to the mill on the main haul road. This eliminated a third of a mile of road that would have otherwise been constructed through low ground, difficult to build and maintain.

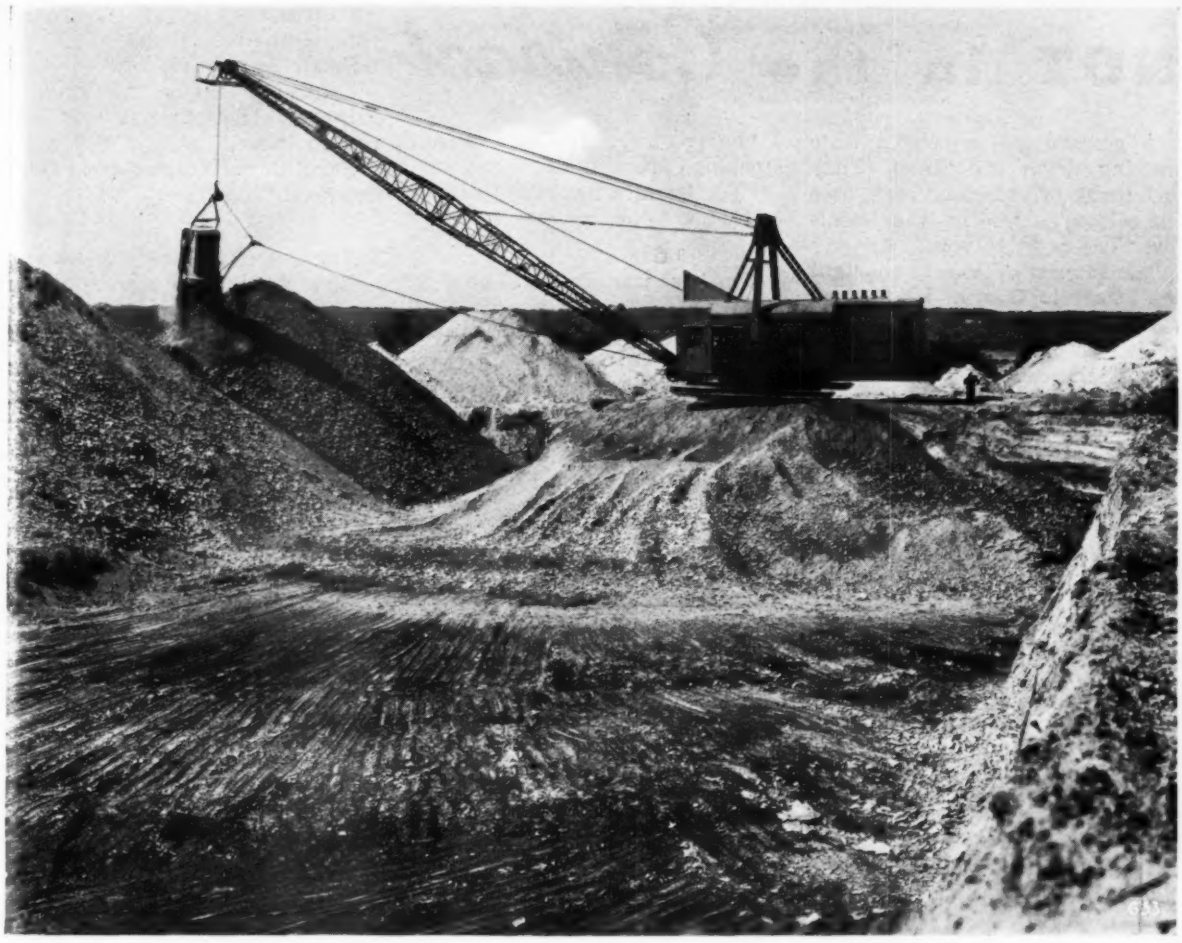
Since ore production started, the 37-B has been loading ore on two 8 hour shifts per day, seven days a week. Average mill production per shift is around 1000 tons of concentrate with recovery by weight running about 65%. The concentrate is high grade, averaging around 60% iron, dry analysis. The mill product is loaded into 75-ton railroad cars and shipped to the docks at Duluth, Minnesota, where it is loaded into boats for shipment down the Great Lakes to the steel mills. Two stacking conveyors stockpile the concentrates when cars are not available. An Athey Mobiloader mounted on a D-8 Caterpillar tractor was used at the start of the operation to move stockpiled ore away from the short stacking belt, but this operation was eliminated by putting in a 100-foot swinging stacker conveyor. The Mobiloader is now used only to load cars from stockpile. This machine, with a 3½-yard bucket, can under favorable conditions load as high as 350 tons of ore per hour into cars.

Stripping operations have continued through the summer season. The 34-B works three seven hour shifts, seven days a week, uncovering ore. Hired trucks, Fords, Internationals, and Chevrolets, all of two-yard capacity, are used at this shovel. The 37-B on the night shift moves up into the stripping also unless there is rock to be moved in the pit. Payment for material moved is on a bank measure basis. This required an engineer's estimate of the overburden, paint rock and ore removed from the pit each month. Since the first of the year, total materials moved up to September 1, are as follows:

Overburden	500,000 cubic yards
Paint rock	62,000 cubic yards
Crude ore	408,000 long tons

Operating crews at the Argonne Mine consist of five men per shift in the mill; ten to twelve truck drivers, two shovel runners and oilers, a bulldozer operator and two dump men on the mining end of the operation. A two-man crew does the drilling and blasting. Two mechanics repair and service the contractor's equipment. All told, around 80 men are employed at the Argonne.

The Evergreen Mines Co. is operating 6 mines on the Mesabi Range this year, in addition to as many more on the Cuyuna and Vermillion ranges of Minnesota, so Mr. Perry Harrison, general manager of the company finds himself a very busy man. The Evergreen's operations at the western end of the Mesabi are under the charge of Hugh Harrison, district superintendent of three mines. The author of this article is in active charge of the Argonne operations as superintendent, with Arne Tuomala filling the job of night foreman. Werner Kangas is chief engineer, supervising engineering work at all the Evergreen's mines. E. A. Young superintends his contract work, assisted by three foremen, John Menozzi, Ray Saari, and Archie Grier.



STOP! LOOK! LEARN!

There's a minimum of time spent cleaning off the surface of the coal when you strip with a Bucyrus-Monighan. Accurate control lets your operator peel the overburden off without either wasting coal or leaving too much material to be bladed off by a bull-dozer. There's no need to sacrifice output to get accuracy, either. For 27 years Bucyrus-Monighans have been famous for the dependable day-in, day-out performance that adds up to big output and low costs.

BUCYRUS MONIGHAN

Sold by

Bucyrus-Erie

SOUTH MILWAUKEE, WISCONSIN

For your convenience in writing to Bucyrus-Erie Co., you will find a card bound in this issue.

NOT in the *Contract*

A general and a colonel were walking down the street. They met many privates and each time the colonel saluted he would mutter, "The same to you."

The general's curiosity soon got the better of him, and he asked, "Why do you always say that?"

"I was once a private," answered the colonel, " and I know what they are thinking."

"The man who marries my daughter will get a prize."

"May I see it, please?"

The woman autoist posed for a snapshot in front of the fallen pillars of an ancient temple in Greece.

"Don't get the car in the picture," she said, "or my husband will think I ran into the place."

"Conductor, will you help me off the train?"

"Sure. But why?"

"You see, I'm stout, and have to get off the train backwards. The porter thinks I'm trying to get on and gives me a shove on again. I'm five stations past my destination now!"

"Pardon me, dear, I believe your stockings are wrinkled."

"You brute! I have no stockings on!"

The boat was sinking. The skipper rushed up to a crowd of scared passengers. "Who among you can pray?", he asked them.

"I can," answered a minister.

"Then pray, mister," ordered the skipper.

"The rest of you put on life preservers. We're one short."

Mistress—"When you wait on my guests tonight be careful not to spill anything."

Maid—"Don't worry, ma'am. I won't say a word."

A man rushed into the newspaper office and demanded to see the editor. "Sir," he cried as he walked around the room, "your paper has libeled me. You have called me the lightweight champion."

"But that is true," returned the editor. "You are Mr. Fightwell, aren't you?"

"Yes, yes," cried the other, "but it's my brother who is the boxer. I'm a coal merchant."

"There must be some mistake boss, the plans don't call for a basement!"

Canvasser: "I say, sonny, is your mother at home?"

Small Boy: "Yes, sir."

Canvasser (after knocking in vain): "I thought you said she was at home."

Small Boy: "Yes, sir, but I don't live here."

The inebriated one was leaning against a lamp-post when a policeman found him. He shook the man.

"You can't stand around here," he advised. "Go on home to bed."

The reveller blinked a bleary eye.

"What time ish it?" he inquired.

The officer looked at his watch.

"It's just six o'clock in the morning."

"Too late," the other hiccoughed. "I get up at five-thirty."

Bill (as he caught up with Gus on the way back to camp):

"Gus, are all the other boys out of the woods yet?"

Gus: "Yes."

Bill: "All six of them?"

Gus: "Yes, all six of them."

Bill: "And they are all safe?"

Gus: "Yes, they are all safe."

Bill (chest swelling). "Then, I've shot a deer!"

The tramp approached a door marked "Dr. Roberts" and knocked. A lady answered the summons and he inquired politely: "Has the Doc an old pair of pants or two, that he could let me have, missus?"

"No," the lady answered sweetly, "they wouldn't fit you."

"Are you sure?" he questioned.

"Quite sure," was the reply. "You see, I'm the doctor."

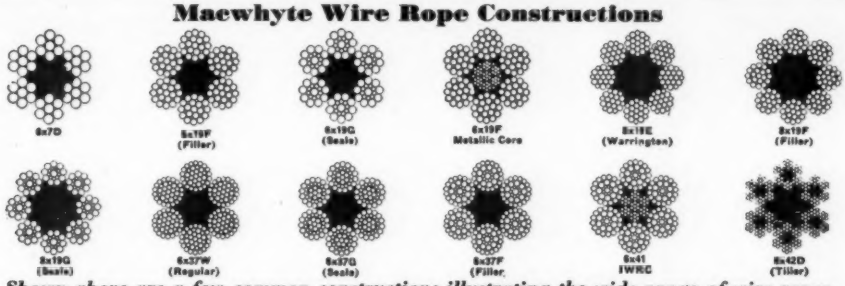
"But, who would want to steal a Pullman ladder?" expostulated the conductor.

"I don't know, but she's gone," responded the porter.

At this juncture an old maid passenger occupying an upper berth for the first time overheard the conversation, parted the curtain and generously remarked:

"Porter, you may use mine, I won't need it till morning!"

Macwhyte Wire Rope Constructions



Shown above are a few common constructions illustrating the wide range of wire ropes available to meet various degrees of flexibility and abrasion resistance in operation.

Select The CORRECT Wire Rope For Your Equipment—Save Time and Money

(No. 8 in a series of informative articles for wire rope users prepared by the Macwhyte Wire Rope Company. Previous articles in this series are available on request on your company letterhead.)

Your wire ropes are subjected to . . .

1 **Bending fatigue.**
2 **Abrasive wear.**
3 **Loading stress.**

A Wire Rope is designed either to give most satisfactory service under any one of the above conditions . . . or any combination of them.

You must determine(or let Macwhyte engineers determine for you) the major factors affecting your ropes; then install the rope that will meet these factors to the best advantage.

Remember, wire ropes must have:

Flexibility to meet *bending fatigue.*
Abrasion resistance to meet *abrasive wear.*
Strength to meet *loading stresses.*

How to Determine Flexibility

Flexibility of a wire rope is determined by the number and size of its wires. Generally speaking, a rope with a small number of large wires is (See Fig. A) much less flexible than a rope with a greater number of smaller wires (See Fig. B).

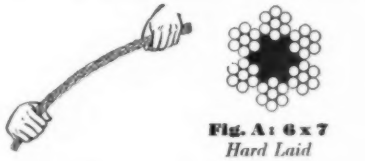


Fig. A: 6 x 7
Hard Laid

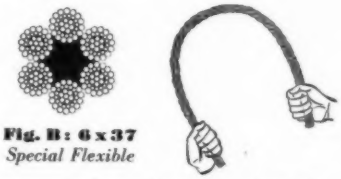


Fig. B: 6 x 37
Special Flexible

Between these two extremes are numerous wire rope constructions that vary the degree of flexibility. The flexibility needed is determined by the smallest diameter sheave or drum on the equipment. Wire rope catalogs contain information regarding proper sheave diameters for various constructions of rope but it must be remembered that often flexibility must be sacrificed for abrasion resistance and a compromise is often necessary.

One of the reasons why Monarch Whyte Strand PREformed wire rope has become so popular is because the preforming of the rope increases its flexibility which is especially valuable where a compromise is necessary to get the best service.

How Abrasion Resistance Is Determined

The *abrasion resistance* of a wire rope is determined principally by the number and size of the *outside wires* in each strand in the wire rope. The wire rope, Figure A, for example, has high abrasion resistance. Notice that this rope has fewer but larger outside wires than rope Figure B. However, even though there might be an extreme abrasion condition of service that would normally require a rope having the best abrasion resisting characteristics, yet a compromise must often be made where sheaves are relatively small.

How Strength Is Determined

The strength of wire rope required for a specific piece of equipment depends a great deal upon the necessary safety factor of operation required.

A wire rope is never used up to its maximum strength. Many factors such as bending, and friction through sheaves and around drums, and also in some cases the weight of the rope itself adds considerably to the actual load that the rope is caused to sustain.

Therefore, each type of operation usually has a specific safety factor which must be considered before it can be determined whether or not a specific rope is strong enough for the job. (Copies of previous articles in this series discussing safety factors are available on request.)

What to Do

There have been many installations where the proper application of wire rope has doubled the service with a consequent double saving in wire rope dollars. Keep service records on the basis of tons of material handled, car miles traveled, ton miles, etc., rather than hours and days of service to see how the specific wire rope you are using likes its work.

Consult with Macwhyte Company or any one of its many distributors on any question pertaining to wire rope, its application, and the service you are getting.

There are hundreds of installations like yours on which Macwhyte wire rope engineers have had experience. They can save you the trial and error method of determining the best rope for your use.

The new Macwhyte general wire rope catalog G-14 contains over 60 pages of helpful information that will save you money. Write for a copy on your company letterhead.

NO. 574

MONARCH
Whyte Strand
PRE-FORMED
. . . the CORRECT rope for your equipment

MACWHYTE COMPANY
2903 Fourteenth Avenue · Kenosha, Wis.
Manufacturers of Wire Rope to meet every need—left-&-right lay braided slings—stainless steel wire rope—monel metal wire rope—aircraft cable, aircraft tie rods, Safe-Lock cable terminals.
New York · Pittsburgh · Chicago · Fort Worth
Portland · Seattle · San Francisco
Distributors throughout the U. S. A.

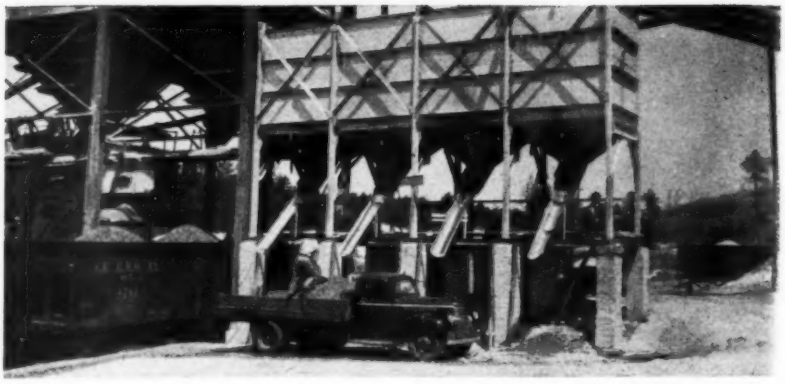
For your convenience in writing to Macwhyte Company, you will find a card bound in this issue.

Rock Chapel . . .

(Continued from page 569)

stone moves upward to the main loading bins, where, after recleaning and rinsing, it can be dropped into railway cars or into special bins for truck hauling.

Recent demands on the output have shown a vital need for larger stockpiles, so a Bucyrus-Erie 20-B clamshell crane has been put to work stocking additional stone. For the same reason, a truck-mounted scraper hoist with crescent bucket is in full-time operation. A Bucyrus-Erie 10-B shovel and two trucks were rented to do grading for recent plant changes.



• Steel loading bins dump Rock Chapel aggregate into railway cars or trucks for its final ride to the consumer.

In addition to crushed stone, the company markets Granite Concrete bricks. These are made on a Dunbrik machine from the fines left after screening. Thus 10,000 tons of worthless by-product, that had to be trucked out of the way, have been developed into a paying product. A newly-installed concrete block machine will make additional products. Trucking of brick as well as stone is done by contract haulers or owner-operated trucks.

Practically all of the repair work for the plant is done in the shop under the supervision of John Cody, foreman. Maintenance shop equipment includes three lathes, a drill press, radial drill, 200-ton press, threading machine, shaper, two electric welders and two oxy-acetylene outfits.

The main camp is composed of a line of company-owned houses equipped with electricity and water. Annual competitions for attractive yards keep the grounds neat. All nearby houses are also occupied by quarry employees, several of whom have lately built homes of their own near the job. A cooperative store is owned and run by the employees. Officially designated as "Rock Chapel Consumers' Cooperative Corporation" it is familiarly known as the "Jot 'Em Down." Complete school and church facilities also combine to make Rock Chapel a pleasantly livable community.

Measure the VALUE of "Hercules" (Red Strand) Wire Rope by what it will do

RESULTS are what count—now more than ever. In order to speed up production, and still maintain a reasonable margin of profit, it is of utmost importance to use materials and equipment of proven dependability. For over 55 years "HERCULES" (Red Strand) Wire Rope has been demonstrating its stamina and trustworthiness. Its record of *consistent* performance—day after day, and month after month—has made and held a host of loyal friends. Such performance is never a matter of chance, but the result of sound fundamental principles, extensive research, experienced organization, and efficient manufacturing facilities.

Why not measure the ultimate value of "HERCULES" (Red-Strand) Wire Rope by the accurate yardstick of performance? Give it a chance to prove just what it can do. You will quickly discover that its long life makes for more continuous production and lower operating cost.

HAVE YOU TRIED Preformed "HERCULES" RED STRAND WIRE ROPE —?— IT'S TOPS AS A MONEY SAVER

MADE ONLY BY
A. LESCHEN & SONS ROPE CO.
WIRE ROPE MAKERS — ESTABLISHED 1857
5909 KENNERLY AVENUE — ST. LOUIS, MISSOURI, U. S. A.

NEW YORK • • • 90 West Street
CHICAGO • • 810 W. Washington Blvd.
DENVER • • • 1554 Wazee Street
SAN FRANCISCO • • 520 Fourth Street
PORTLAND • • 914 N. W. 14th Avenue
SEATTLE • • 3410 First Avenue South

For your convenience in writing to A. Leschen & Sons Co., you will find a card bound in this issue.

PAVING THE WAY FOR NATIONAL DEFENSE

Tapered Roller TIMKEN BEARING EQUIPPED

Bucyrus-Erie 4-Wheel Scrapers operate on TIMKEN Bearings.

Construction equipment is almost as important an item of National Defense as the actual armament itself. Thousands of miles of new roads must be made; more and more military air fields built; hundreds of new plant sites prepared; military cantonments constructed; and a great deal of other work done—military and non-military.

Most of the machines engaged on these projects are equipped with TIMKEN Tapered Roller Bearings, for their manufacturers long ago discovered that TIMKEN Bearings permit higher operating speeds, promote smooth running, increase dependability and endurance and sharply reduce maintenance expense.

When buying new construction equipment of any kind you'll be wise to make sure it is Timken Bearing Equipped.

TIMKEN
TAPERED ROLLER BEARINGS

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

For your convenience in writing to The Timken Roller Bearing Co., you will find a card bound in this issue.

Notes from the manufacturers

The Linn Manufacturing Corporation, Morris, New York, has appointed J. M. Homs export manager according to an announcement by Lee Bowler, sales manager. Mr. Homs is well known in the export line and will have offices at 44 Whitehall Street, New York, New York.

American Optical Company, Southbridge, Massachusetts, announces it will be glad to place any industrial firm on its mailing list for a free safety poster service inaugurated several years ago. At certain intervals during the year dramatic, colorful safety posters, driving home to workers the value of safety precautions, are made up and mailed to concerns desiring the service.

Chain Belt Company, Milwaukee, Wisconsin, celebrated its 50th anniversary on September 9. Founded in 1891 for the purpose of producing an improved type of detachable chain, it has since expanded its activities and is today recognized as one of the largest producers of chain belts, construction machinery, elevating and conveying equipment and other closely related products.

LaPlant-Choate Manufacturing Company, Inc., Cedar Rapids, Iowa, and the Caterpillar Tractor Company, Peoria, Illinois, recently held a joint business and pleasure meeting for their distributors at Alden Rapids, Iowa. In addition to the 150 distributors, a special train brought 70 officials and department heads from Caterpillar Tractor Company. Highlights of the meet were the demonstration of new equipment outside of town and a banquet at the Roosevelt Hotel. After the banquet, prizes were awarded to winners of the golf matches, swimming and bridge contests.

"NO MORE BRAKE LINING BOTTLENECKS FOR US," He Says

"The wonderful results from GATKE Swing Frictions have opened my eyes. Think of the time we've saved. We are starting right now to get GATKE Recommendations for every Brake Lining, Clutch Facing, and Friction Requirement of all our equipment from Shovels to Trucks.

From now on when we need replacements we will be able to get GATKE Job-Selected Materials promptly. This GATKE System makes it easy."

YOU, too, will find that GATKE Brake Lining, Clutch Facings and Swing Frictions pay big bonuses in dependability and long service. They are made for all requirements. Just tell us what you need or write for information about the GATKE Job-Selected Friction Service.

GATKE CORPORATION
232 N. La Salle St. Chicago, Ill.

Hercules Powder Company, Wilmington, Delaware, has elected R. N. McAdams secretary of the company according to an announcement by Charles A. Higgins, president. Mr. McAdams was formerly assistant secretary and assistant treasurer of the company. William R. Stevens, formerly credit manager was elected assistant treasurer. George B. Baylis, formerly with the treasurer's office was elected assistant secretary. John B. Lodge, assistant credit manager was appointed credit manager.

Caterpillar Tractor Company, Peoria, Illinois, was represented at the recent Fourth Pan-American Congress by J. Q. McDonald, export manager; Frank Pogolotti, export engine sales supervisor and Robert Culshaw of the sales development division. Held in Mexico City, the congress is presenting a gigantic display of modern developments in road building equipment and is sponsored by governments of the western hemisphere and held under the auspices of the Department of Communications and Public Works of Mexico.

The Buda Company, Harvey, Illinois, has promoted Harold G. Smith, former chief engineer of their automotive division, to executive engineer in charge of all engineering of automotive, marine, and industrial engine and radial diesel engine division, according to announcement just released by R. K. Mangan, executive vice president. Mr. Smith is a member of the S.A.E., a member of S.A.M.E., and is on the engine standards committee of the society of automotive engineers.

Gar Wood Industries, Inc., Detroit, Michigan, according to J. B. Haile, general manager of the road machinery division, has announced that A. C. Berg has been placed in charge of manufacturing for that division. Mr. Berg has been in the employ of Gar Wood Industries, Inc., since 1919.

For your convenience in writing to Gatke Corporation, Inc., you will find a card bound in this issue.

New trade literature

Title: **"American Machinists Handbook" (Seventh Edition)**

Subject: Much new data has been added and sections have been rearranged and condensed to retain all necessary information. Two hundred text pages have been added which brings the total to 1,350 pages which includes 2,500 illustrations. Covers a wider field of shop activities than ever before and continues to act as reference for persons connected in any way with machining operations of any kind.

Where to Get: McGraw-Hill Book Company, Inc., 330 West 42nd Street, New York, New York, Price $4.00.

Title: **"Hydraulic Machinery"**

Subject: Design, application, operation, and maintenance of hydraulic presses and shears, including those used in the manufacturing of armaments are dealt with. Articles of interest are discussed as follows: principles of hydraulics and their application, forging pressures, hydraulic presses used in the manufacture of armaments, special forging presses used in the manufacture of railway material, hydraulic presses for miscellaneous duties and hydraulic shearing machines. Accompanied by 50 photographs and diagrams.

Where to Get: Chemical Publishing Company, Inc., Brooklyn, New York.

Title: **"Cleaning Manual"**

Subject: An interesting, illustrated, 12-page booklet packed with the latest, up-to-the-minute "how to do it" information on cleaning a wide range of road building and construction equipment before repair and repainting or for regular maintenance. Concise data is given on pressure-spray and steam gun methods for thoroughly, speedily removing oil, grease, tar, dirt from a variety of excavating equipment.

Where to Get: Oakite Products, Inc., 57 Thames Street, New York, N. Y. Free upon request.

Title: **"Welding Handbook"**

Subject: A revised, twenty page handbook of welding electrodes and accessories.

Where to Get: Hobart Brothers Company, Box EW-79, Troy, Ohio. Free upon request.

Title: **"Materials Handling Equipment"**

Subject: A new 20-page booklet describing electric motors and controls for cranes, hoists and gantry bridges for use in central stations, construction projects, and industrial plants. Controllers, protective devices, and methods of motor braking are also described and illustrated.

Where to Get: Dept. 7-N-20, Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pennsylvania. Free upon request, ask for bulletin B-2264.

Title: **"Defense Savings Bonds and Stamps"**

Subject: A 16-page book discussing the reasons for issuing bonds and stamps which are suitable for purchase by small as well as large investors, and the results which it is hoped to accomplish through the regular investment of current savings in defense issues.

Where to Get: U. S. Treasury Department, Defense Savings, Washington, D. C. Free upon request.

Title: **"Training Workers and Supervisors"**

Subject: Specific industrial training text book covering principles and working methods for selecting employees, placing in right jobs, training to attain good standard performance in quality and quantity production and building dynamic program

A "PRIZE PACKAGE"
PROTECTS This BETTER WIRE ROPE!

Every reel protecting Union's high quality wire ropes is as carefully made as the rope itself. The strength of heads, rigidity of connections, and use of only smooth-faced drums —all together form a reel built to prevent damage to the rope through shipment or handling. All known precautions are taken to insure perfect Union Wire Rope for all orders.

UNION WIRE ROPE CORPORATION
GENERAL OFFICES AND FACTORY:
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Tulsa • Houston • Chicago • Salt Lake City
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UNION Wire Ropes
The "ULTIMATE LOW COST WIRE ROPE"

For your convenience in writing to Union Wire Rope Corporation, you will find a card bound in this issue.

rooted in vital morale and cooperative management and labor relationships. Methods all from wide, successful experience; simple, practical, immediately applicable.

Where to Get: The Ronald Press Company, 15 East 26th Street, New York, New York. Price $1.50.

Title: **"Land-clearing Tools"**

Subject: A booklet on land clearing, twelve pages in two colors. Features a section devoted to the King Ranch in Texas, a 900,000 acre ranch where extensive land clearing is practiced using modern methods and machinery.

Where to Get: LaPlant-Choate Mfg. Co., Inc., Cedar Rapids, Iowa. Free upon request.

Title: **"Power Shovel and Dragline Parts"**

Subject: Eight page bulletin giving complete details on power shovel and dragline parts of genuine 13% manganese steel. These parts for power shovels and draglines are illustrated, as well as other parts that are subjected to abrasive wear or impact in heavy duty service.

POSITIONS WANTED

Address all box numbers
c/o EXCAVATING ENGINEER
South Milwaukee, Wis.

SHOVEL-DRAGLINE-CRANE OPERATOR

Experience of 20 years, mostly on Bucyrus-Erie machines, steam, gas and diesel. Also gas-electric. Can do repair work. Willing to go anywhere. Now located California. Box 9176

WIDELY EXPERIENCED OPERATOR

Working steadily past year operating crane on steel-setting. Have operated all types of excavating machinery from coast to coast and in South America. Have handled strippers and loaders. Pile driver experience. Now located in Indiana. Box 9174

OPERATOR-MECHANIC

Twenty years experience as shovel operator and mechanic. Also crane operator. Prefers Erie, Thew, Lima or Byers. Free to go anywhere. Now located Ohio. Box 9175

SUPERINTENDENT — OPERATOR

Operator with 20 years experience, superintendent of general construction, operator of shovels, draglines, etc. Also maintenance engineer. Prefers work in Western or Southern United States. Best references. Located Wisconsin. Box 9177

Where to Get: American Manganese Steel Division of The American Brake Shoe & Foundry Company, Chicago, Ill. Free upon request, ask for bulletin No. 641-S.

Title: **"The Fast, Modern Way to Drill"**

Subject: New bulletin describing the latest U14 type ¼" capacity, small, light one-hand electric drills. Containing six pages of information and specifications on ¼" portable electric drills for every industrial application, this circular presents the complete range of models, motor sizes, speeds and switch styles.

Where to Get: Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago, Ill. Free upon request, ask for circular No. JE-112.

Title: **"Bomber Flying Fields"**

Subject: An authoritative presentation, in three main subdivisions, as follows: The Need for Scientific Design of Runway Pavements on Military Flying Fields, Suggested Method for Field Evaluation of Subgrade Support (With four blue print cross-sections of designs required under varying subgrade conditions), and Specification for Hot-Mix Asphaltic Concrete Pavement for Heavy Bomber Flying Fields.

Where to Get: The Asphalt Institute, 801 Second Avenue, New York, New York.

BARGAINS IN USED EQUIPMENT

FOR SALE, RENTALS, BUSINESS OPPORTUNITIES, TRADES, ETC.

To the reader wishing to advertise used equipment in the "For Sale" Section: All advertising in this section is payable in advance. Enclose your check or money order with copy. Rate: 60c per line. Minimum charge $2.40. No discounts; no commissions. If no change in copy is desired, three continuous insertions are offered for the price of two. Read these instructions carefully. Each line contains 41 characters (34 characters if all capital letters are used). Count spaces and punctuation as one character each. Allow 10 characters for box number, if blind advertisement is desired. Count your own copy to save delay. Holding up your advertisement one month to secure approval of revised copy or an additional remittance may cost you real money in a lost sale. Be sure to enclose the correct amount of money with your order. Closing date—15th of preceding month. Example: January issue closes December 15th.

To the reader wishing to answer "For Sale" Section advertisements appearing on these pages: Be sure to address your inquiry to the advertiser by using the correct box number. Mail your letter in care of Excavating Engineer, South Milwaukee, Wisconsin. Write each advertiser a separate letter. Do not write us for name and address of advertiser. This information will not be given out. We have no information about the equipment advertised other than that shown in the advertisements themselves.

SMALL SHOVELS, CRANES AND DRAGLINES

Up to 2 Cubic Yards

P&H MODEL 206, ¾-yd. shovel in good operating condition, or will trade for ⅜ or ½-yd. crane, truck or crawler mounted. Paul Borchardt, Highland Park, Illinois.

BUCYRUS-ERIE GA-2 Gas-Air high lift shovel. 24' boom. 18'4" dipper handle. 1¼ yd. dipper. Waukesha 6¼"x8" 4-cylinder engine. Electric starter. Quantity spare parts included. Excellent condition. Located Eastern Pennsylvania. Box 2774

MARION Model 361. 1½ yard gas shovel. Also 50' boom clamshell equipment. Electric starter. Buda engine. Located Connecticut. Box 2808

BUCYRUS-ERIE 45-B 65' boom gas dragline. 2 yd. bucket. Buda engine. Good working condition. Located Louisiana. Box 2812

FOR SALE OR RENT

NORTHWEST Model 80-D, 2½ cu. yd. Diesel shovel. 8 Athey 16 cu. yd. model FB-32, 2-way, Dump Trailers on 30-ton tracks. 8 model D-8 Caterpillar tractors. This equipment purchased new January 1940, used approximately 4 months. Box 2789

Good used **AMERICAN HOIST & DERRICK** steam shovel, ditcher and crane. Rail type, full revolving, 30' boom for use as a crane. Shovel, boom with dipper and ditcher attachment.

J. C. Campbell Co.
413 W. Michigan St. Duluth, Minn.

BUCYRUS-ERIE 52-B 60' boom Diesel dragline. 3 yard bucket. Located Louisiana. Box 2813

INSLEY MODEL R ½-yard gas shovel, dragline and clamshell. Engine completely overhauled. Good as new. Balance machine thoroughly field checked—some new parts added. Located Indiana. Box 2783

Dragline-Crane For Rent

READY TO WORK. K44 Link-Belt crawler dragline-crane. 55' boom, 1¾-yd. drag bucket. Crane capacity 25 tons at 12'. Light Plant. Located Iowa. Box 2798

LORAIN MODEL 60 1 yd. gas shovel. Waukesha engine—recently overhauled. Operating condition. Located Minn. Box 2743

LORAIN Model 40 ⅝ yard gas shovel. Excellent condition. Located Connecticut. Box 2803

BUCYRUS-ERIE GA-2 High Lift 1 yd. Shovel. Waukesha WS engine. Single Shaft Cats. Operating condition. Located eastern Pennsylvania. Box 2776

LORAIN 75-A 1¼ yard dipper. In good condition. $2,000. Located Missouri. Box 2828

BUCYRUS-ERIE GA-2 Gas-Air 1¼ yd. extra high lift shovel. Waukesha engine. Excellent condition. Located northwestern Pennsylvania. Box 2816

LORAIN MODEL 60 1 yd. Gas Shovel. Waukesha engine. Machine generally overhauled few months past. Operating condition. Located Minnesota. Box 2743

UNIT ¾ swing shovel. ⅜ cu. yd. Good condition. Located Kansas. Box 2824

NORTHWEST 104 shovel. Twin-City 7¼x9 gasoline engine, 1¼-yd. dipper; extra 1-yd. skimmer-scoop attachment. Buffalo Rock Coal Co., Ottawa, Ill.

BUCYRUS-ERIE 37-B. Gas—60' boom clamshell with Rudomatic tagline. Electric starter. Located Connecticut. Box 2807

OSGOOD 906 SHOVEL. 1⅝ yd. Amsco Bucket. New type all welded 35-ft. boom. 33 ft. stick. Waukesha-Hesselman Engine. Used approximately 12 months. Box 2821